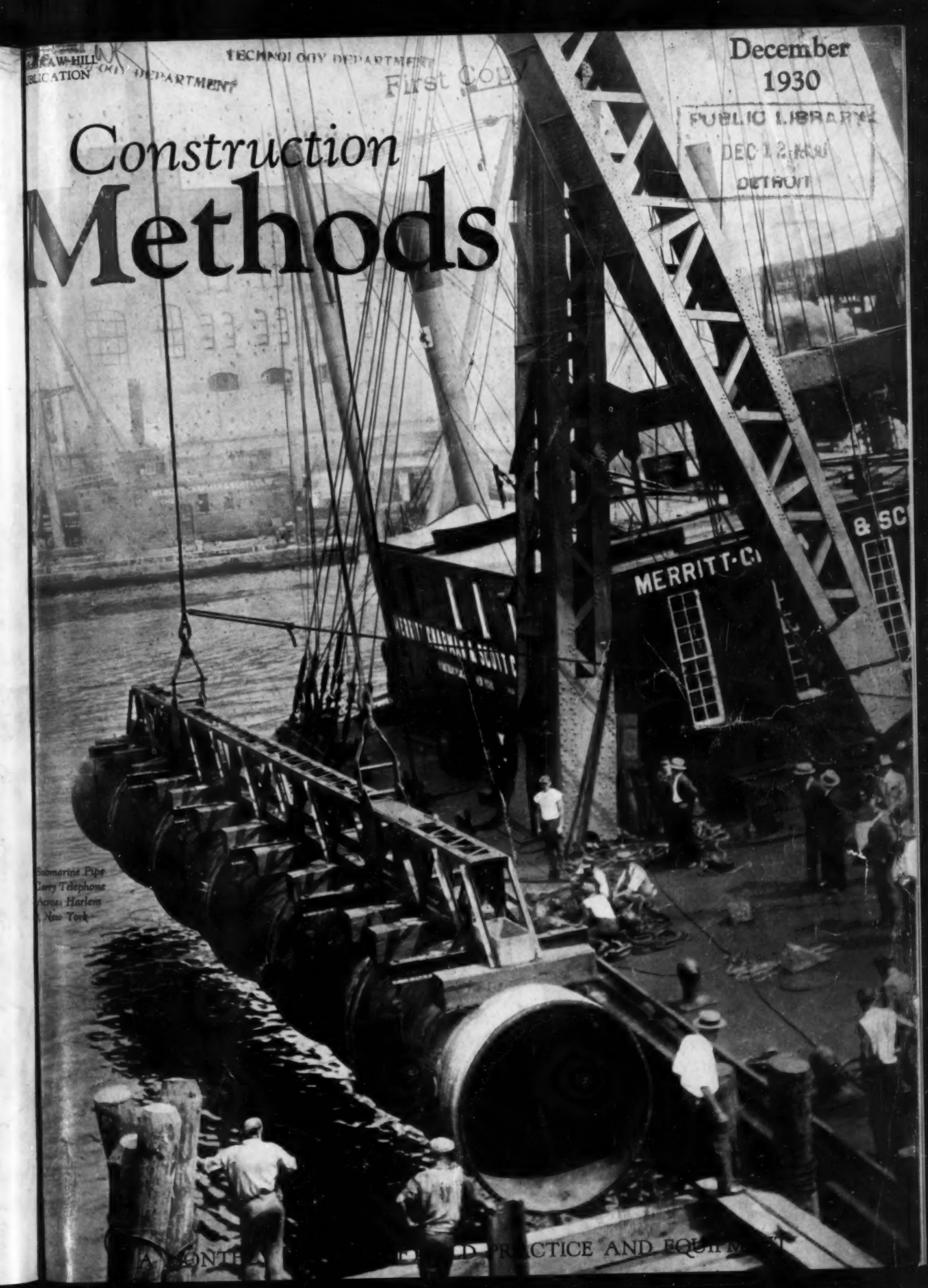
TECHNOLOGY DEPARTMENT
First Copy
PUBLIC LIBRARY
DEC 12 1930
DETROIT

December
1930

# Construction Methods




Submarine Pipe Carry Telephone Across Harlem River, New York

A MONTHLY RECORD OF PRACTICE AND EQUIPMENT

# CLETRAC

# AT THE 1931 ROAD SHOW

A bigger, better and more elaborate show than ever before! A gigantic convention of a gigantic industry! Surely you'll attend this greatest of the year's industrial events.

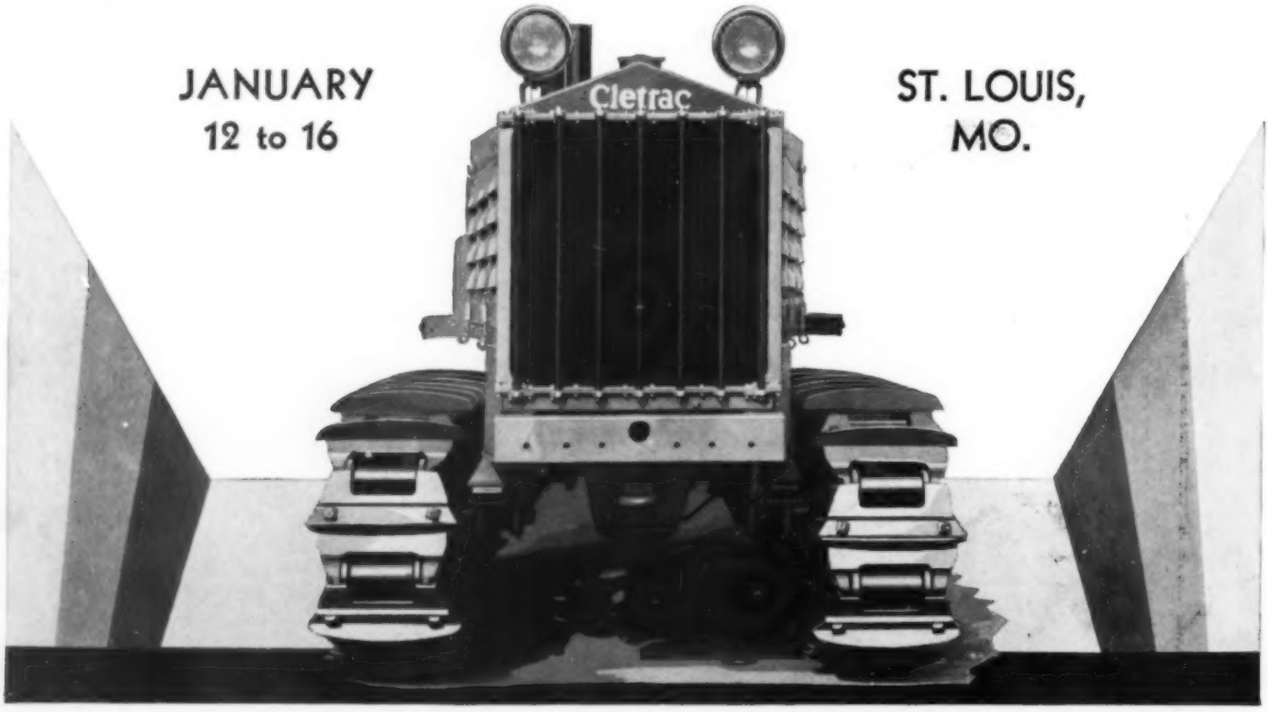
Cletrac extends to you this cordial invitation to visit its booth and hotel headquarters when attending the Show in St. Louis.

The Cletrac Line will be shown in Exhibition Building "A" in adjoining spaces Nos. 24 and 44. This will be one of the high spot exhibits of the Show. You will want to see it — and get first hand the really big facts about Cletrac's complete line of tractors for the road builder, contractor and general industrial user of tractor power.

THE CLEVELAND TRACTOR COMPANY, 19323 EUCLID AVE., CLEVELAND, OHIO

JANUARY
12 to 16

ST. LOUIS,
MO.



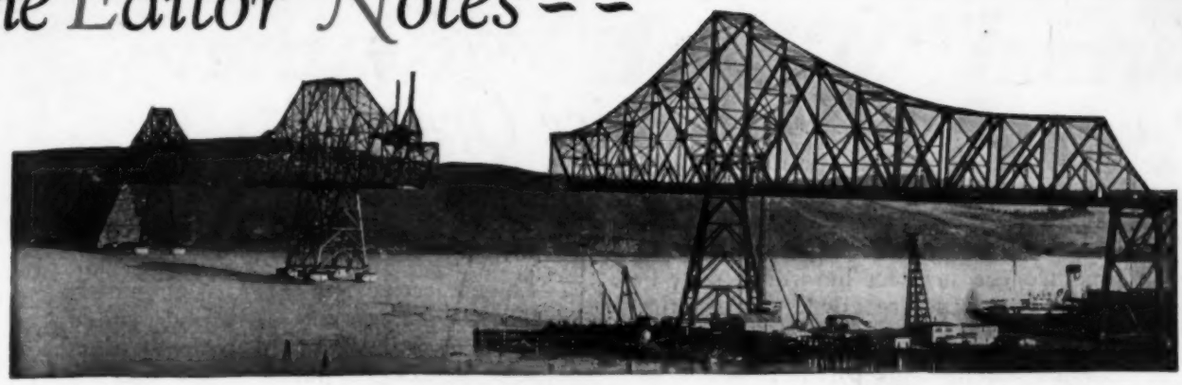


CONSTRUCTION METHODS, December, 1930. Vol. 12, No. 12. Published monthly. McGraw-Hill Publishing Company, Inc., Tenth Avenue at Thirty-sixth Street, New York, N. Y. $1 per year; 10 cent per copy. Entered as second-class matter, October, 1926 issue. Vol. 8, No. 19, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.



TECHNOLOGY DEPT.

# The Editor Notes - -



### *Road Builders' Convention Next Month*

MORE than one-quarter of a billion dollars will be released to swell employment and alleviate the business depression through highway bonding issues passed in the November elections, according to a statement issued by W. A. Van Duzer, president of the American Road Builders' Association. Of the total authorization of $295,800,000 in bonds for highways and bridges, more than one-half goes directly to labor. Added to these figures are other estimates by road authorities on labor costs for production of the materials and machinery used in road building; these percentages range as high as 30 per cent.

Thus it will be seen that when the states vote to spend another $300,000,000 for road construction, it means that some $200,000,000 will soon be added to the payrolls of highway departments, contractors, and equipment manufacturers.

With an active road-building year in sight for 1931, special interest attaches to the forthcoming annual convention of the American Road Builders' Association which will meet in St. Louis, Mo., Jan. 12-16. In addition to a full quota of papers on special highway subjects, the program includes a number of valuable committee reports. The Road Builders' convention next month is an event that no highway engineer or contractor can afford to miss.

### *Itemized Bids*

Each year sees new items added to the lists which local road builders' associations urge their state highway departments to use in taking bids. Road building operations are being broken down into an ever greater number of separate items. Contractors evidently have come to the conclusion that honest and speedy settlements are more desirable than the advantage resting with the experienced road builder in lump-sum bidding.

Some critics of thoroughly itemized bidding complain that it puts the contractor's skill in estimating on public record. Any intelligent man, they say, can gain a fair knowledge of estimating by studying a sufficient number of bids. Granted that this assertion is partly true—aside from the fact that bids often are unbalanced in the hope of reaping extra profit on expected over-runs—what does the experienced contractor lose by his frankness? If he educates beginners to estimate correctly, he saves himself and his industry from the curse of more price-cutting. By listing a unit price for each operation, he simplifies the figuring of estimate payments and makes settlement more prompt. As a last great advantage, he eliminates dispute over the amounts to be credited or debited for over-runs and under-runs.


**CONSTRUCTION METHODS**

*A monthly review of modern construction practice and equipment*

ROBERT K. TOMLIN, *Editor*

*Editorial Staff*

VINCENT B. SMITH NELLE FITZGERALD

J. I. BALLARD (San Francisco)

WILLARD CHEVALIER, *Publishing Director*

*A McGraw-Hill Publication*

Tenth Avenue at 36th Street, New York


### *Road Maintenance by Contract*

Ohio's state highway department, this year, has inaugurated the policy of letting contracts for highway maintenance, thus departing from the traditional practice of handling this type of work by day labor with its own forces. The first awards on bids received last April covered the sealing of cracks and joints in 1,903 miles of concrete pavement. Bid prices were below the engineer's estimate on each of the ten contract sections, the average cut being about 25 per cent.

### *World's Highest Dam*

TOWERING 389 ft. above bedrock in Diablo Canyon on the upper Skagit River in Washington, the Diablo dam, just completed by the City of Seattle for power development, now has the distinction of being the highest dam in the world. It exceeds the Pacoima dam in California by 9 ft., and the U. S. Bureau of Reclamation's Arrowrock dam, which for 15 years held the honor, by 40 ft.

This record, however, will be short-lived, as the Owyhee dam, now under construction in Oregon, will be 522 ft. high, while the Hoover dam of the Boulder Canyon project on the Colorado River will be built to a height of more than 700 ft.

### *Mississippi Series Ends*

Just a year ago, in its issue of December, 1929, *Construction Methods* began its series of articles on "The Defense Against Old Man River." This number contains the thirteenth and final chapter of the story on the $325,000,000 program of construction for flood control in the Mississippi valley.

This huge job of earth moving and bank revetment under the direction of the Corps of Engineers, U. S. Army, has developed methods and equipment of interest to every construction man. Some of the operations, such as the bank revetment work, are decidedly special, but the levee-building machines and methods have an application on other types of construction involving the movement of large yardages of earth.

In presenting the story of Mississippi flood control work the aim has been to illustrate profusely every method and every type of machine in use on the river. The 227 illustrations published since the series of articles began are believed to be as complete a pictorial record of Mississippi levee-building and revetment work as has ever been assembled.

# *What Price Orders?*

EVERY manufacturer must make at least two products. He must manufacture the product he would sell; he must manufacture orders for that product.

In the manufacture of his product, scientific production has taught him how to cut his costs to the bone. But as production costs have dropped, distribution costs have tended to rise. New margins for saving must now be sought in the cost of selling, rather than in the cost of production—in the cost of manufacturing orders, rather than in the cost of manufacturing products.

Lower production costs have come through the intelligent choice of products, sound organization, larger production, the skillful selection and use of modern production tools. Lower sales costs can be achieved only through intelligent choice of markets, sound sales organization, larger consumption, the skillful selection and use of modern selling tools.

Of these last, advertising is the chief. What the modern tool is to production, advertising is to selling. The one reduces the cost of manufacturing a product; the other reduces the cost of manufacturing an order. The one makes possible larger production without excessive production cost; the other makes possible larger sales volume without excessive sales cost.

To be effective, such advertising must be wisely planned and skillfully applied. Often it will be an investment—along with the designs, patterns, jigs, dies and other tools of production—the cost of which should be spread over the business of years, constantly reducing the cost of manufacturing each order. This is an investment in a market, just as there must be an investment in a product.

As there are appropriate tools for the several processes of production, so there are advertising tools for the various needs of selling. When each of these has done its part the salesman must come to assemble their work into the finished product—*an order*. And the master salesman of today is the one who knows his tools—what they can do and how to use them. The day for barehanded selling has passed with the day of hand manufacture. The salesman who does not know how to use advertising to cut the cost of his orders is brother to the mechanic who cannot use the modern tools of production.

The advertising section of *Construction Methods* is one such tool of more economical selling to the construction field, serving alike the interest of the manufacturer and of the user of his products.

Willard Chevalier
*Publishing Director*

**McGRAW-HILL PUBLISHING COMPANY, INC., TENTH AVENUE AT 36TH STREET, NEW YORK, N. Y.**

CABLE ADDRESS: "MACHINIST, N. Y."

JAMES H. McGRAW, *Chairman of the Board*
MALCOLM MUIR, *President*
JAMES H. McGRAW, JR., *Vice-Pres. and Treas.*
EDWARD J. MEHREN, *Vice-President*
MASON BRITTON, *Vice-President*
EDGAR KOBAK, *Vice-President*
HAROLD W. McGRAW, *Vice-President*
H. C. PARMELEE, *Editorial Director*
C. H. THOMPSON, *Secretary*

*Member A.B.C.*
*Member A.B.P.*

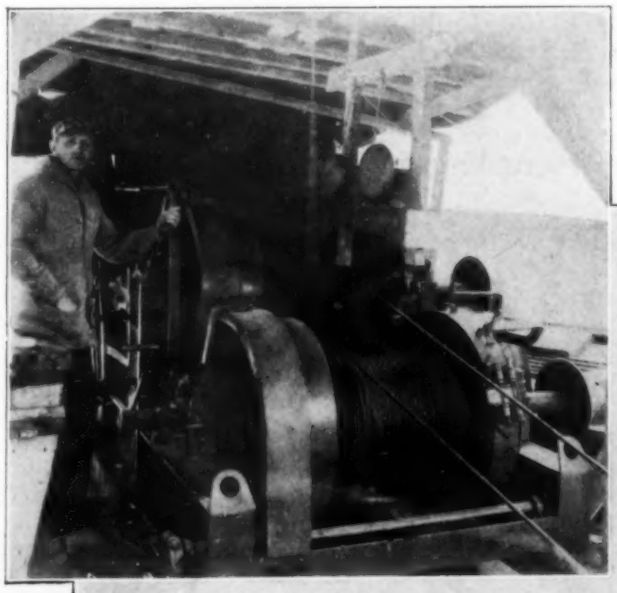
NEW YORK *District Office, 285 Madison Avenue*
BOSTON, *1427 Statler Building*
WASHINGTON, *National Press Building*
CHICAGO, *520 North Michigan Avenue*
PHILADELPHIA, *1600 Arch Street*
DETROIT, *2-257 General Motors Building*
CLEVELAND, *Guardian Building*
GREENVILLE, S. C., *1303 Woodside Building*
ST. LOUIS, *Bell Telephone Building*
SAN FRANCISCO, *883 Mission Street*
LOS ANGELES, *632 Chamber of Commerce Bldg.*
LONDON, *6 Bouverie Street, London, E. C. 4*

*Copyright, 1930, by McGraw-Hill Publishing Company, Inc.*

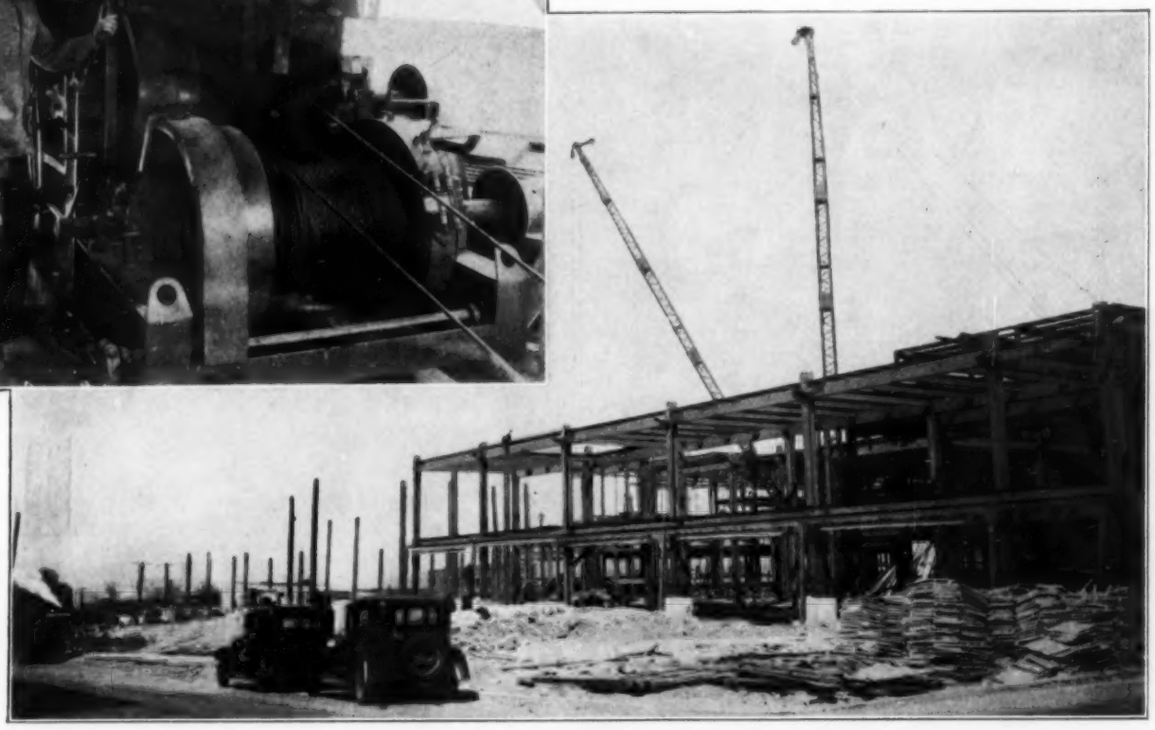
# Announcing! A NEW band friction Clyde hoist.

Self-energizing internal expanding frictions. Double brake bands. Air cooled brake flanges. Roller bearing drums. Ring-oiling intermediate shaft bearings. Steel cut gears. Steel frame.

*Additional information about this new Clyde, gladly sent upon request.*



The illustration shows the new Clyde gasoline hoist with internal expanding band frictions, operating steel erectors' derrick for the Lehigh Structural Steel Co. on the Public School building in Brooklyn.



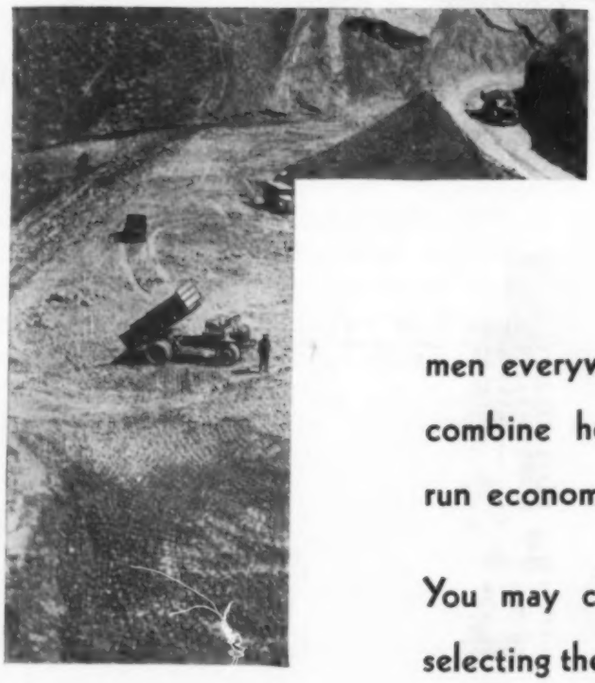
## CLYDE IRON WORKS SALES CO.

DISTRIBUTORS FOR CLYDE IRON WORKS DULUTH, MINNESOTA

— BRANCHES —

| | | | |
|---|---|---|---|
| NEW ORLEANS: | 309 MAGAZINE ST. | MEMPHIS: | 69 UNION AVENUE |
| PORTLAND, OREGON: | 555 THURMAN ST. | NEW YORK: | 856 EAST 136TH STREET |
| SEATTLE: | 3410 FIRST AVENUE SOUTH | VANCOUVER, | - - BRITISH COLUMBIA |
| CHICAGO: | 11 SO. LASALLE STREET | | 1325 STANDARD BANK BLDG. |

# There is a Rugged, Precision-Built Autocar Chassis FOR EVERY CONSTRUCTION NEED



A fleet of short-wheelbase engine-under-seat Autocars is faithfully bearing the brunt of the hauling work in constructing the new Ridge cut-off on the Los Angeles to San Francisco Valley route. Von der Hellen & Pierson, contractors.

AUTOCAR TRUCKS are built to pace-setting standards of precision. Construction men everywhere know them for their ability to combine heavy-duty performance with long-run economy.

You may choose from 44 chassis models in selecting the Autocar for the job you have to do. Many of these models have been engineered from stem to stern to meet contractors' requirements.

Write today for a free copy of the Autocar Construction Booklet, containing information and photographs of interest to every contractor.

PRECISION BUILT

## AUTOCAR TRUCKS

THE AUTOCAR COMPANY, ARDMORE, PA.

# of the purchasers of the first one hundred NORTHWESTS have signified their satisfaction by buying a second, third, fourth . . . even a twelfth machine

WAS there ever a greater assurance of the kind of service you want than this?

Look into the money-making features responsible for this great endorsement!

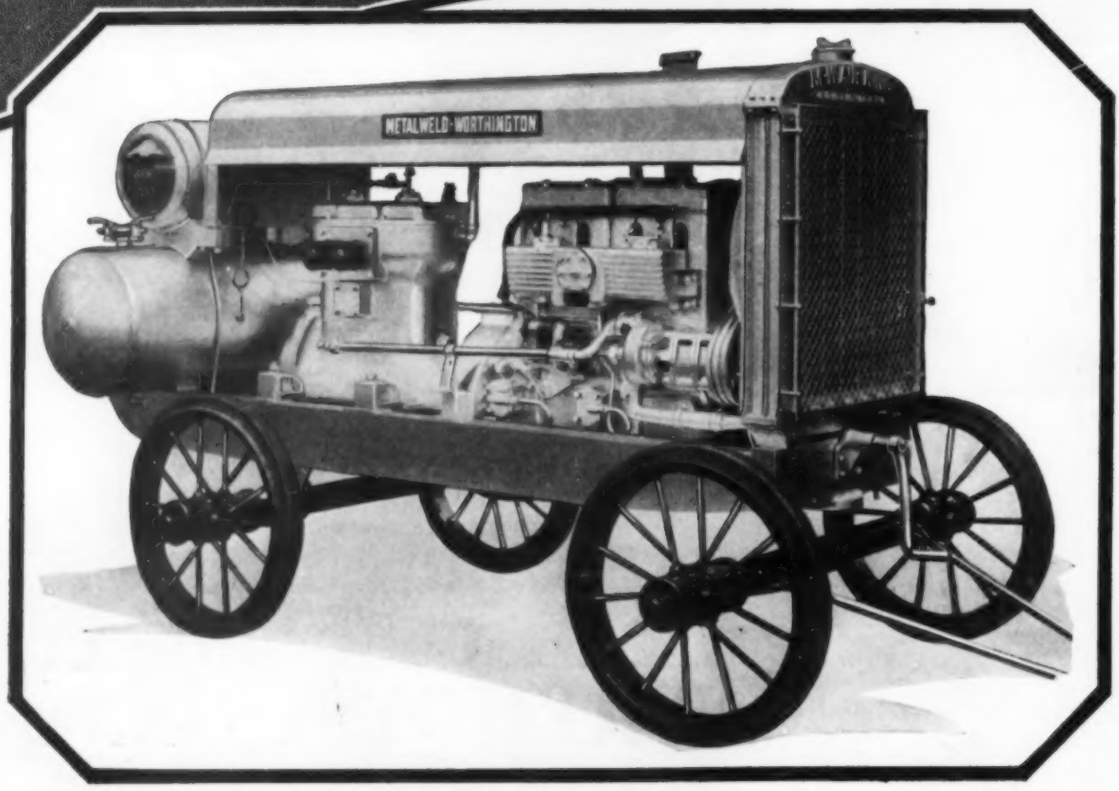
NORTHWEST ENGINEERING COMPANY

*The world's largest exclusive builders of gasoline, oil burning and electric powered shovels, cranes and draglines*

1728 Steger Building
28 East Jackson Boulevard
Chicago, Illinois, U. S. A.

NORTHWEST

# TEN POINTS OF SUPERIORITY
# THE GREATEST VALUE




## REPEAT ORDERS FROM THESE FIRMS PROVE "AIR KING" QUALITY

United Engrs. & Constrs.
Public Service Prod. Co.
Pennsylvania Railroad
Cleveland Railways Co.
Sun Oil Company
American Bridge Co.
Illinois Steel Co.
Kansas City Struct. Steel Co.
Great Lakes Constr. Co.
National Gunite Contr. Co.
J. A. Mercier Co., Detroit
Reading Railway Co.
Baltimore & Ohio R.R.
Lehigh Struct. Steel Co., Allentown, Pa.
Keystone Paving Co., Philadelphia
Pennsylvania Water Co., Pittsburgh, Pa.
City of Minneapolis
Union Paving Company, Philadelphia, Pa.

# METALWELD-WORTHINGTON
## PORTABLE AIR COMPRESSORS

# MARK THE "AIR KING" IN THE PORTABLE FIELD

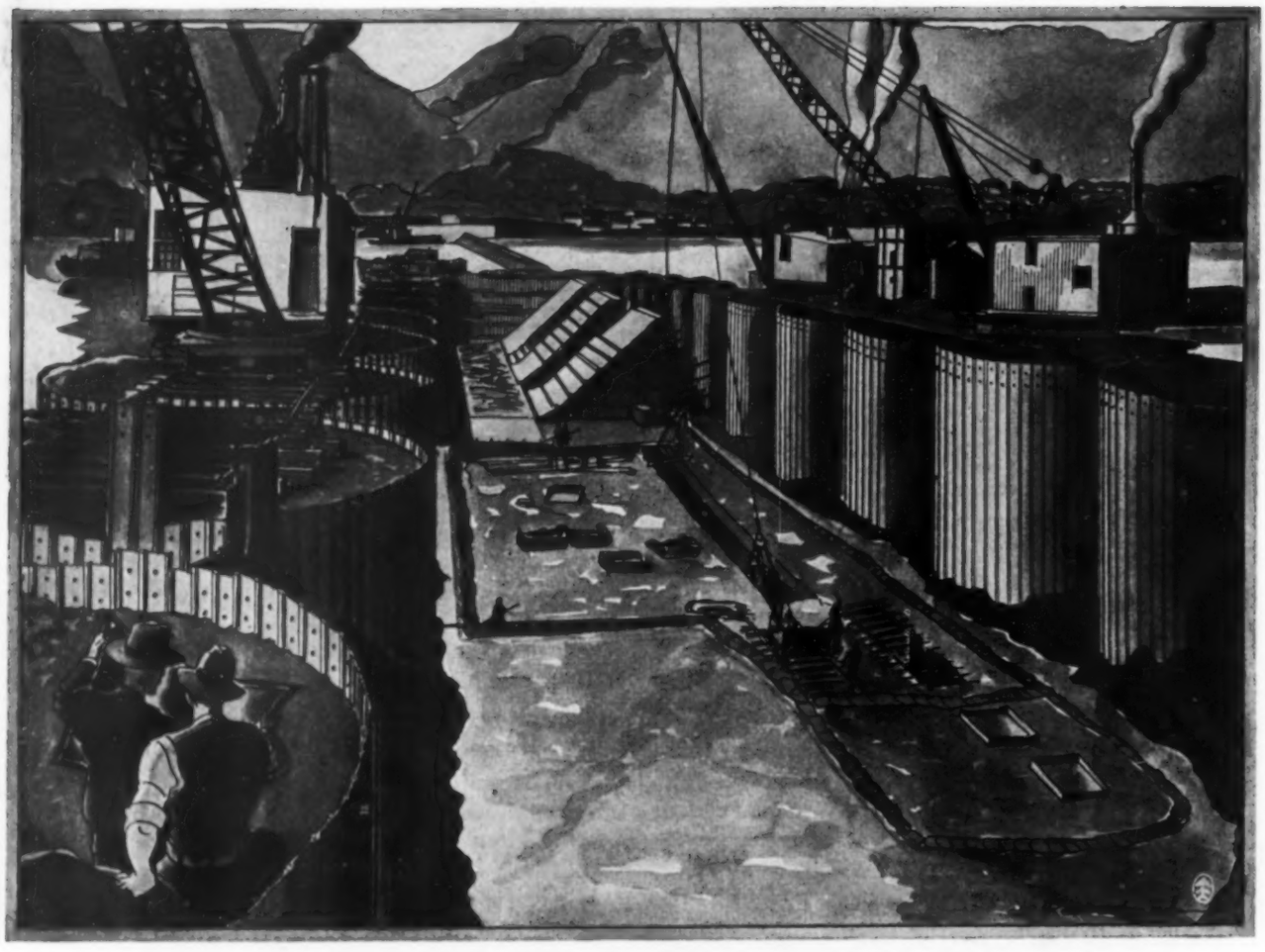
1. ***WORTHINGTON "FEATHER VALVES"*** eliminate all buffer plates, discs and auxiliary springs. Over one million in successful use. An exclusive "AIR KING" feature.
2. ***TRUE FULL FORCE FEED LUBRICATION*** in both compressor and engine. Other compressors offer *partial* force feed lubrication. "AIR KING" offers *true* full force feed lubrication to all bearing surfaces.
3. ***OIL COOLING AND FILTERING SYSTEM*** of costly design built into the powerful "AIR KING" engine, cuts down crankcase dilution and adds years to the engine life. Insures the greatest value from any grade of oil.
4. ***AUTOMATIC UNLOADING SYSTEM*** designed to accelerate engine before compressor load comes on, by means of a separate idling butterfly, effects savings in gasoline, oil and wear of machine.
5. ***IMPROVED COOLING SYSTEM*** delivers cooled water direct from radiator to both compressor and engine by means of divided flow circulation. Compressor cylinders are water-jacketed their entire length.
6. ***REMOVABLE CYLINDER SLEEVES*** in the "AIR KING" engine make reboring of cylinders and the use of oversize pistons unnecessary for all time.
7. ***COUNTERBALANCED CRANK SHAFTS*** reduce vibration. Engine and compressor shafts are both statically and dynamically balanced and permanently fixed in correctly balanced relation to each other. This fact, together with the extra large bearing surfaces, reducing bearing pressure, makes for long, satisfactory and economical compressor life.
8. ***QUICK DETACHABLE SPRING-LINK COUPLING*** remains noiseless, greaseless and trouble free. An exclusive, patented "AIR KING" feature that has proved universally successful in the field.
9. ***ELECTRICALLY WELDED ALL-STEEL FRAME*** avoids the uncertainties of castings. Unconditionally guaranteed against breakage for the entire life of machine.
10. ***ACCESSORIES OF HIGHEST QUALITY ONLY*** are used: Genuine Robert Bosch Magnetos, Zenith Carburetors and the accepted types of gasoline gauges, filters, primers and cleaners.

*Complete illustrated catalog forwarded on request.*
*No obligation, no cost.*

METALWELD, Inc., 26th and Hunting Park Ave., Philadelphia, Pa.
*Dealers in principal cities.*

METALWELD WORTHINGTON
AIR KING
*Portable Air Compressors*

# METALWELD-WORTHINGTON
## PORTABLE AIR COMPRESSORS



# . . Fortresses of Strength . .

An interesting installation of piling was that of the Dead Man's Island Dam on the Ohio River. The Dravo Contracting Company used the filled cellular cofferdam type of construction. Each cell was 40′ in diameter and tied by two short connecting walls to the adjoining cell. No bracing was necessary, the cells standing of their own weight. 3090 tons of Carnegie Steel Sheet Piling, section M 107, was used. This, a straight web section, was chosen because it is particularly adaptable to cellular construction where loads are applied inside of the wall and where interlocks are in tension.

Carnegie Steel Sheet Piling is rolled in an efficient range of weights and sizes, including both straight and arch web sections, to cover every possible condition requiring the use of piling. An interlock of particularly rugged construction, ease of driving with no tendency to wedge or creep out of plumb and exceptional watertightness characterize Carnegie Piling Sections.

Engaged in the promotion of steel sheet piling for many years, we have been enabled to collect a vast amount of data as to the successful accomplishment of engineering works involving its use. Our engineering department is at your service.

**CARNEGIE**
**STEEL SHEET PILING**

105

CARNEGIE STEEL COMPANY · PITTSBURGH · PA. Subsidiary of UNITED STATES STEEL CORPORATION

*Bucyrus-Erie 1030 gas convertible dragline — New York Air Terminals, Secaucus, New Jersey.*

# Making the Dirt Fly to Build America's Airports

**Modern aviation has created *digging* jobs.**

**Landing fields don't just happen. Someone must level the land, dig and backfill trenches, excavate basements, fill ditches and ravines.**

**Contractors are finding this new field of digging to be just like any other — profitable if they have the right equipment.**

**And they are finding that Bucyrus-Erie shovels and draglines give the same big-output performance in airport construction as elsewhere.**

**Bucyrus-Erie makes a machine to fit each size job. Each is right in the fundamentals that count — speed, perfect balance, power in reserve, ample strength with least inertia, accessibility, anti-friction bearings, simplified lubrication. You expect trouble-free service and low operating expense over many years —and that's what you get with Bucyrus-Erie.**

**When you take that airport contract, or any other digging or material handling job, it will pay you to get in touch with Bucyrus-Erie.**

**Representatives throughout the U.S.A. Offices or distributors in all principal countries. *Branch Offices:* Boston, New York, Philadelphia, Atlanta, Birmingham, Pittsburgh, Buffalo, Detroit, Chicago, St. Louis, Dallas, San Francisco.**

*Three Gas + Air shovels grading on airport—Detroit, Mich.*

A-172—12-30—CM

BUCYRUS ERIE

**BUCYRUS-ERIE COMPANY, manufacturers of the only complete line—all sizes, types and powers. *Plants:* South Milwaukee, Wis.; Erie, Pa.; Evansville, Ind. *General Offices:* South Milwaukee, Wis.**

# HERCULES ENGINES

HEAVY-DUTY POWER FOR EVERY ROAD BUILDING REQUIREMENT

SEE THEM AT THE ROAD SHOW

ST. LOUIS - JANUARY 10-16

HERCULES MOTORS CORPORATION, CANTON, OHIO, U.S.A.

# NOTHING ELSE LIKE IT...*anywhere*

## SIKA *stops the leak without removing the pressure*

SIKA puts any concrete job in "dry-dock"—when water is pouring through concrete in streams, Sika stops the flood instantly and permanently—without relieving the hydraulic pressure.

Sika is Switzerland's gift to America. For 17 years the architects and engineers of Europe have found Sika indispensable. As applied to building construction, this amazing product sells itself as the most economical of *all* methods for waterproofing foundations. A single use of Sika immediately suggests its application in hundreds of other phases of construction work. There is only one Sika—there is nothing else like it *anywhere*.

Let us tell you about Sika's achievements in the United States on some of the largest and most outstanding construction jobs.

*Write for Literature.*

**SIKA STOPPED THIS**

When digging the foundations of a new Fire Station at Bristol, England, the River Frome burst through the old retaining walls and flooded the excavation. Working in 4 feet of water, the contractors filled the breach with Sika-treated concrete. The work was completed and the excavation pumped dry in six hours. It never leaked again thereafter. Such jobs are easy with Sika. Ask us for particulars.

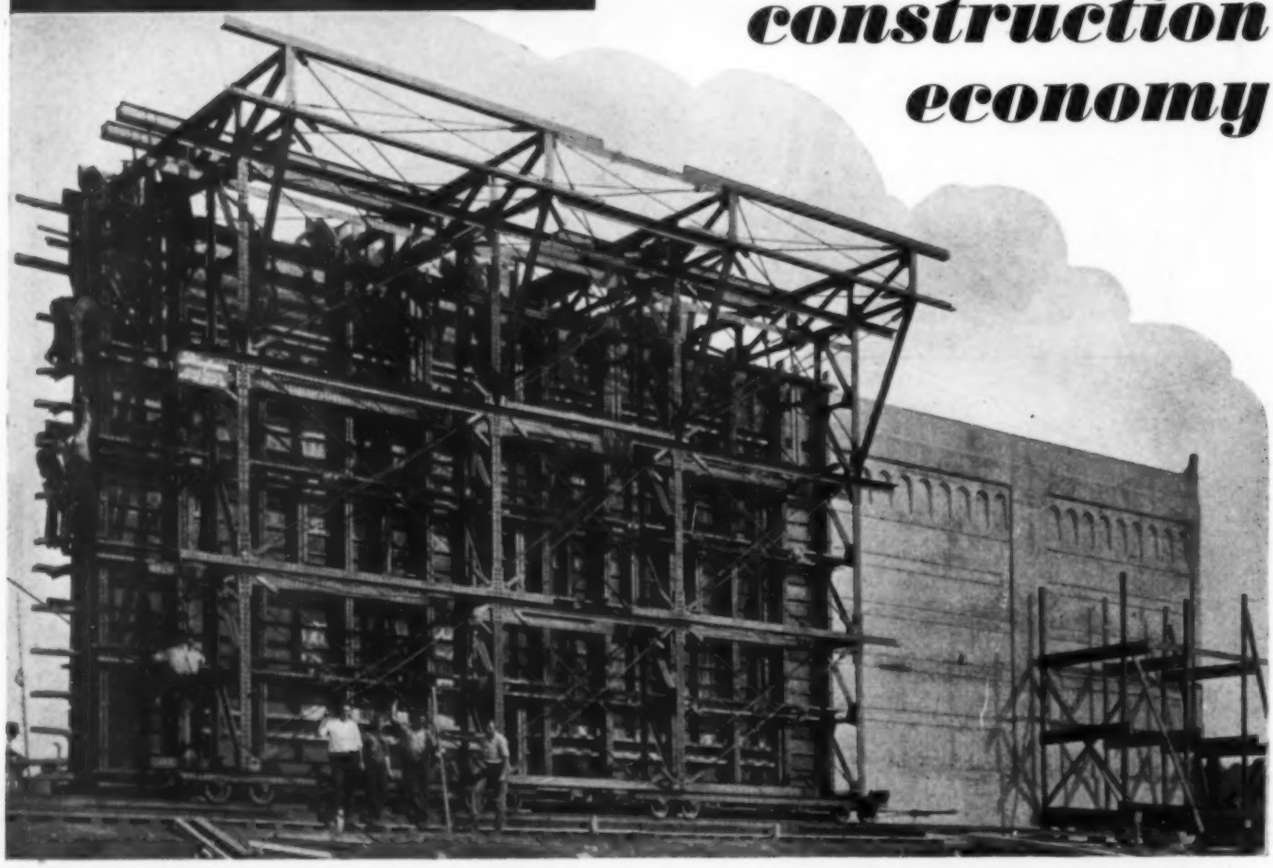
## The American Sika Corporation

56 West 45th Street
New York, N. Y.

413 North State Street
Chicago, Ill.

Sika Canada Limited
1198 University Street, Montreal, Canada

# STEEL FORMS --paid for by construction economy



BLAW-KNOX TRAVELING WALL FORMS are being used by Spencer & Ross to build the Wyoming Prison Walls at Attica, N. Y.

The 30 ft. high wall is poured in approximately 40 ft. long units. All the intricate facings are poured in one operation and hand finishing is practically eliminated by the use of STEEL FORMS.

Blaw-Knox Engineers have the ability to exchange experiences with construction men and to build STEEL FORMS which will carry the job to a successful conclusion.

Successful conclusion means speed of construction, freedom from trouble—*economies* far in excess of the original cost of the forms.

Blaw-Knox Engineering Service is free—available to all contractors for any kind of concreting work.

**BLAW-KNOX COMPANY**

2086 Farmers Bank Bldg., Pittsburgh, Pa.

New York Chicago Boston Detroit Buffalo
Philadelphia Birmingham Cleveland Baltimore

*Export Division:*

Blaw-Knox International Corp., Canadian Pacific Bldg., New York

London, England, New Oxford House, Hart St., Holborn, W. C. 1.—Paris, France, 1 Rue de Clichy—Milan, Italy, 6, via S. Agnese, 6—Dusseldorf, Germany, 17 Bismarckstrasse

BLAW-KNOX

# "HERCULES" RED-STRAND

REG. U. S. PAT. OFF.

# WIRE ROPE

*Dependable!*

## A Wire Rope that Makes for Economy

Dependability in wire rope means increased economy, for a heavy toll is taken every time a replacement is necessary.

"HERCULES" (Red-Strand) Wire Rope is dependable because it is made of acid open-hearth steel wire, and every wire put into it is first rigidly tested by us to make sure it meets our exacting requirements as to strength, toughness, flexibility and wearing qualities.

If you want to increase your daily yardage and at the same time lower your actual operating costs, give "HERCULES" a chance to show you what it can do. Its performance record is continually making and holding friends.

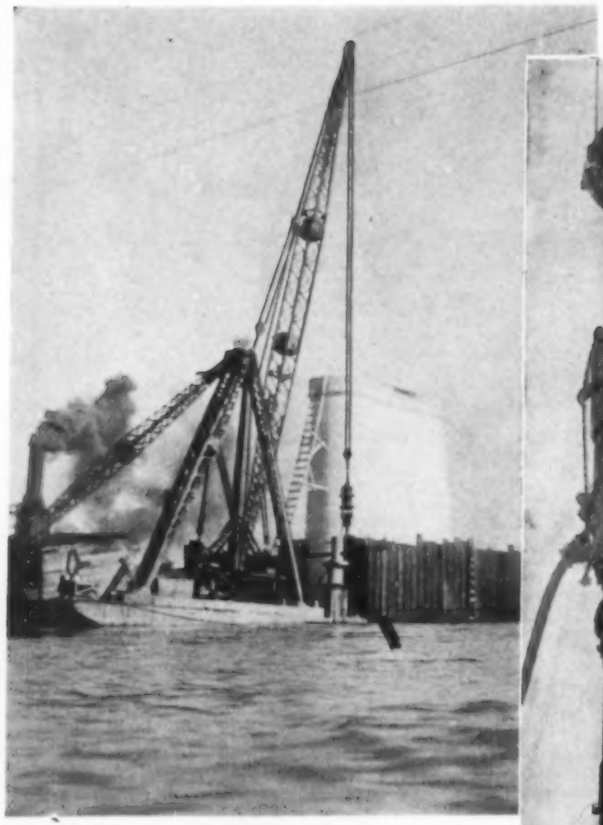
*Send for Catalog No. 37*

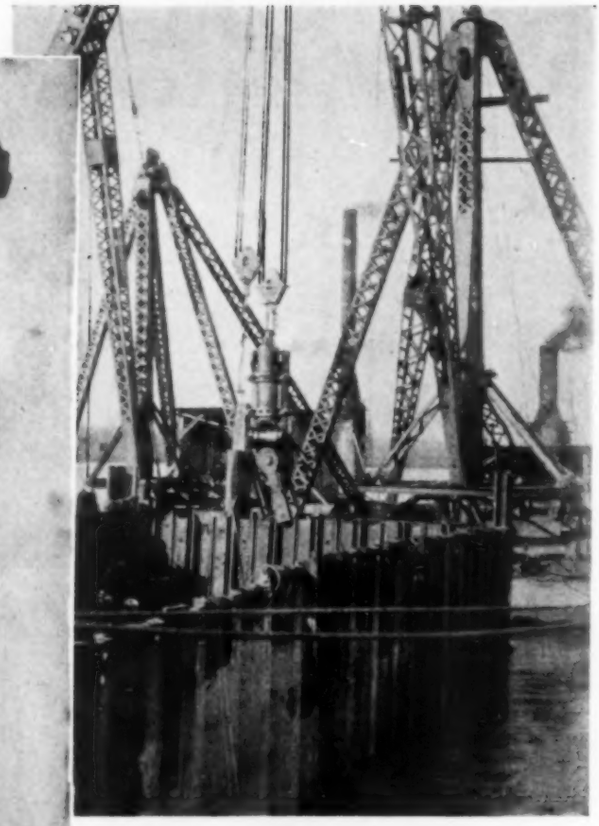
*Made Only By* **A. Leschen & Sons Rope Co.** *Established 1857*

5909 Kennerly Avenue
ST. LOUIS

New York Chicago Denver San Francisco

Distributors at over 100 different points. The name of our Distributor in any particular locality will be furnished gladly upon request.





*Courtesy Hardaway Contracting Co., Columbus, Georgia*

# A machine just for pulling piles—no other jobs

The above is the Warrington-Vulcan Pile Hammer, noted as the "hammer with the *punch*." This hammer embodies a true scientific punching action that means more footage driven with less wear and tear on the hammers or the pile heads.

This is the Vulcan Pile Extractor that has made it possible and economical for the contractor to recover *all* of his used piling.

The Vulcan Extractor is the one tool of its kind made in America, just for pulling piles. It does not need to be inverted and requires no "harness," no adjustment, no rigging up. It is always ready.

Picked up on the crane hook and attached to the pile, then it is ready to drive *out* the pile with 550 blows a minute. A universal joint connection makes it possible for the pile to be laid down while the Extractor is in a vertical position.

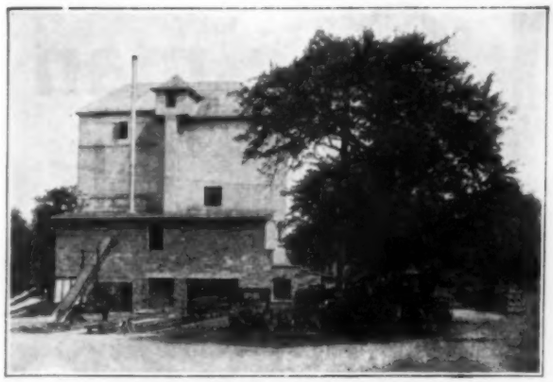
Economical in first cost, and economical and easy to operate. The Extractor is a modern tool that every pile driving contractor should own.

Write for descriptive bulletins.

**VULCAN IRON WORKS**
**327 No. Irving Avenue, Chicago, Illinois**

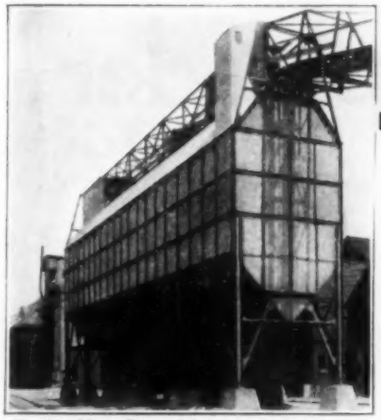
**Southern Representatives:**
**Woodward, Wight & Co., Ltd., 451 Howard St., New Orleans, La.**
**Representatives for California, Nevada and Japan:**
**Harron, Rickard & McCone Co., 1600 Bryant Street, San Francisco, Calif.**
**Representatives for the State of Washington:**
**A. H. Cox & Co., Inc., 1757 First Avenue, S., Seattle, Washington**

# The Vulcan Extractor



*Cement Block Plant, completely equipped with Butler Bins and Proportioning Equipment.*

*Butler Bin with automatic feeder for Asphalt plant.*



*Butler Unit Bin of 5 sections for storage and proportioning of aggregates.*

# STANDARDIZED!

## WHITMORE-RAUBER & VICINUS OF ROCHESTER, NEW YORK IS COMPLETELY BUTLER EQUIPPED

*Ready-Mixed Concrete Plant with bin equipment for aggregates and cement.*

*Type "V" Contractors Bin with All-steel, 2 beam scale and 2 compartment Weighing Hopper.*

**IN replacing old equipment and erecting new plants, this progressive organization has standardized on Butler Bins a means of further improving and perfecting its already efficient service.**

**For Commercial Concrete, Asphalt Preparation, Yard Storage and Proportioning, Cement Blocks and Road Contracting, Whitmore-Rauber & Vicinus has Butler Plants.**

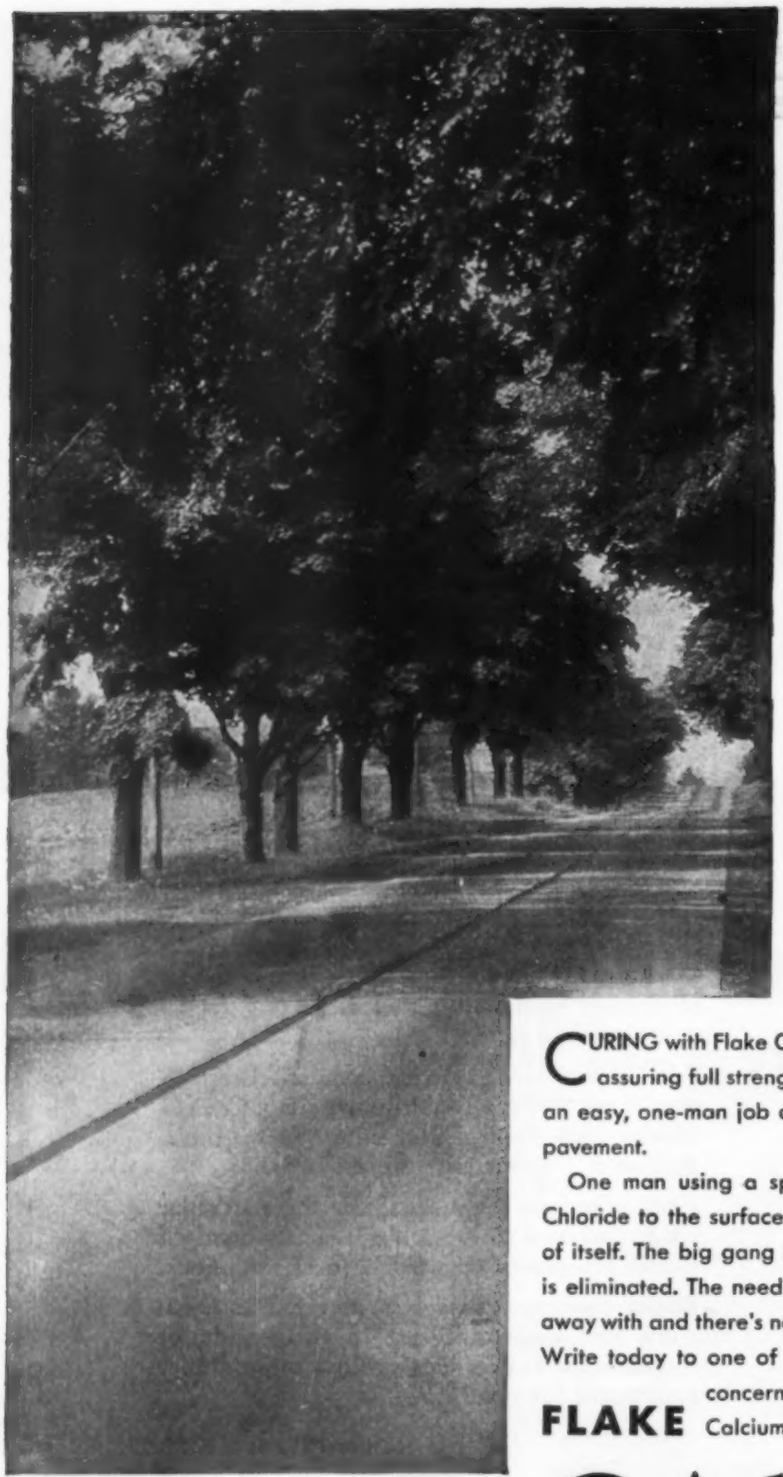
**Each plant was engineered for the particular job it had to do, but each is basically standard Butler equipment adapted to local conditions.**

**Butler equipment has demonstrated its economy and dependability in thousands of installations. Let us suggest the proper Butler equipment for your job.**

**BUTLER**
*Steel* **BINS**

## BUTLER BIN COMPANY

**WAUKESHA** *Representatives in Fifty Cities* **WISCONSIN**



# One man

# with a spreader

**. . . replaces the big gang and the tons of material required by old-time curing methods! . . .**

CURING with Flake Calcium Chloride means a great deal more than assuring full strength concrete through proper hydration. It makes an easy, one-man job of the actual work needed for curing concrete pavement.

One man using a spreader applies the right amount of Calcium Chloride to the surface and the rest of the curing process takes care of itself. The big gang needed for ponding and covering operations is eliminated. The need for sprinkling and constant inspection is done away with and there's no need for a big clean-up after the job is done. Write today to one of the member companies listed for full details concerning up-to-the-minute concrete curing with **FLAKE** Calcium Chloride.

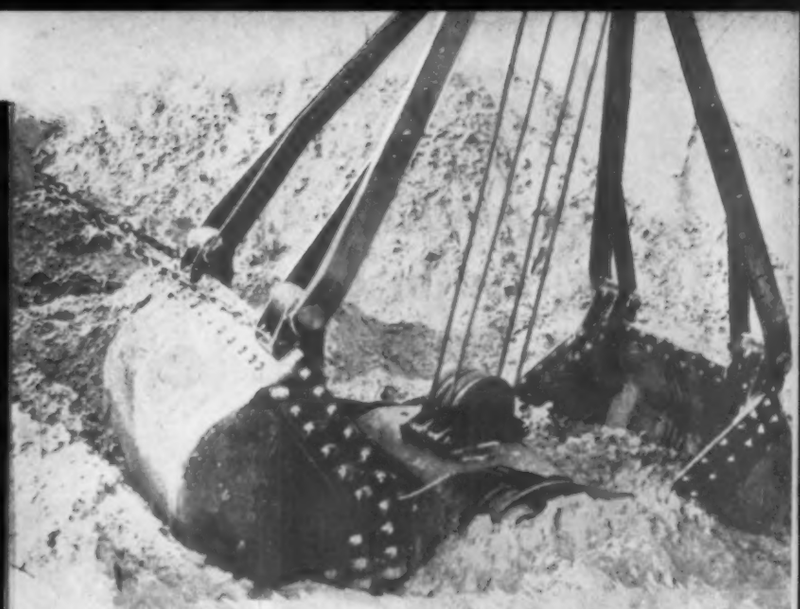
Calcium Chloride curing is approved by the United States Bureau of Public Roads. Ask for booklet 34a

CALCIUM CHLORIDE PUBLICITY COMMITTEE

THE DOW CHEMICAL COMPANY . . Midland, Michigan
SOLVAY SALES CORPORATION, 61 Broadway, New York
THE COLUMBIA PRODUCTS COMPANY, Barberton, Ohio

# CALCIUM CHLORIDE

**CURES CONCRETE**



## WHY AN OWEN REDUCES CABLE COSTS

Consider the exclusive method, in Owen Clamshell Buckets, of mounting the lower sheaves on the main counterweight—high up in the bucket construction—where they cannot work in, and rarely come in contact with material.

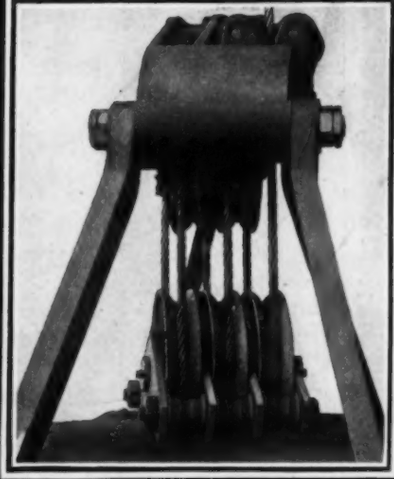
Owen sheaves are large in diameter, properly grooved . . . upper and lower sheaves always in rigid alignment. There is no tipping—no side bends—no reverse bends so destructive to cables.

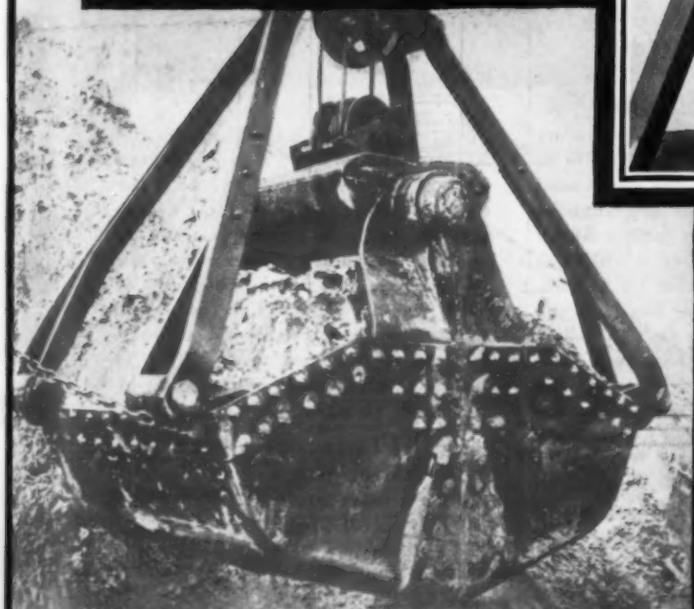
Thus Owen sheave and cable protection increases operating efficiency, reduces cable replacement and saves you money.

Send for an Owen Folder describing the 17 Points in detail—or a Catalogue showing all types of Owen Buckets.

**THE OWEN BUCKET CO.**

6023 Breakwater Ave. Cleveland, Ohio





## 17 POINTS OF LEADERSHIP

1. One-piece steel crosshead.
2. No wear in upper or lower arm ends.
3. Heavy high carbon steel arms.
4. Adjustable undiminished closing power.
5. Long life to sheaves and cable.
6. Long arm bolt bearings sealed from grit.
7. Lever type steel arm brackets.
8. Closing cable is protected against excessive wear.
9. Heavy shock-resisting renewable lips.
10. Cable clips eliminated.
11. Sealed center shaft bearings.
12. Greater digging power with no dead weight.
13. Penetration and clean dumping.
14. Dropping shocks absorbed, eliminating breakage.
15. Rigid shell construction.
16. Heavy duty high carbon drop-forged steel teeth.
17. Lips or teeth points hit first.

# Owen Buckets

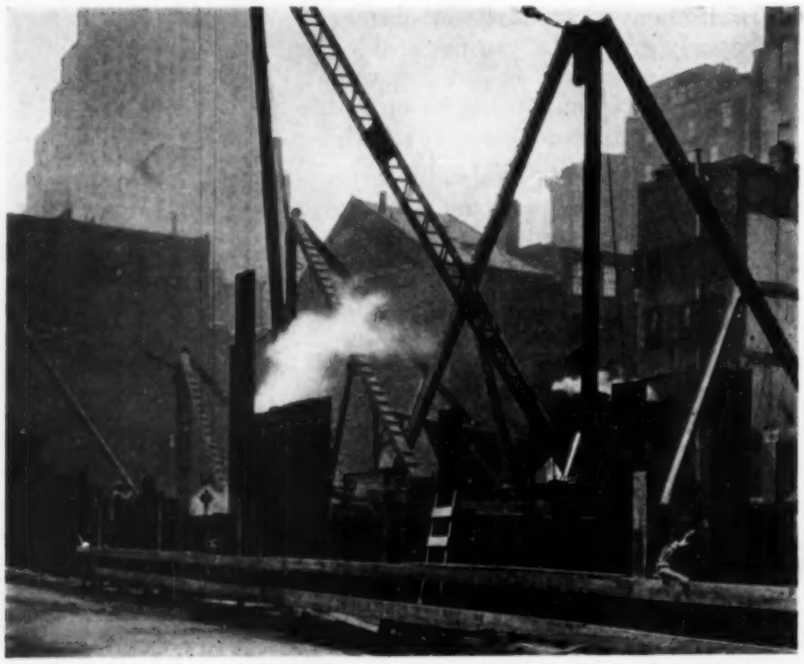
# LACKAWANNA PILING SECTION AP 16

## used in constructing foundations for new

## CITIES SERVICE BUILDING

## New York City

Clinton & Russell, New York City
*Architects*
James Stewart & Co., New York City
*General Contractors*
The Foundation Co., New York City
*Foundation Contractors*



More than 600 tons of Lackawanna Arched-Web Piling Section AP 16, in lengths up to 40 feet, are being used in the construction of the foundations for the new Cities Service Building, in New York City. Although Lackawanna Section AP 16 is comparatively new, having been on the market for less than a year, its selection for this as well as for many other important projects is evidence of the extent to which it has won acceptance by engineers and contractors.

Lackawanna Section AP 16 is 16 in. wide, has a uniform web section of ⅝-in., a strong, positive interlock, and weighs only 22 lbs. per sq. ft. Its flat design offers sufficient transverse strength for driving in long sections and for economical bracing, and at the same time results in minimum driving resistance and minimum tendency to damage at the top from heavy steam-hammer blows.

The most important advantage of Lackawanna Arch-Web Piling Section AP 16 is the fact that it can be driven with all of the arches on the same side of the piling wall. Consequently, in foundation work and in constructing interior foundation walls of trenches, the effective thickness of walls is very slightly reduced and practically no concrete is lost in pouring, as is the case when piling is driven with the arches alternating inward and outward.

There is a Lackawanna Piling Section —Deep-Arch, Arch-Web or Straight-Web for every purpose. Bethlehem engineers will gladly cooperate with you and suggest the section most suitable for your job.

BETHLEHEM STEEL COMPANY
*General Offices:* Bethlehem, Pa.

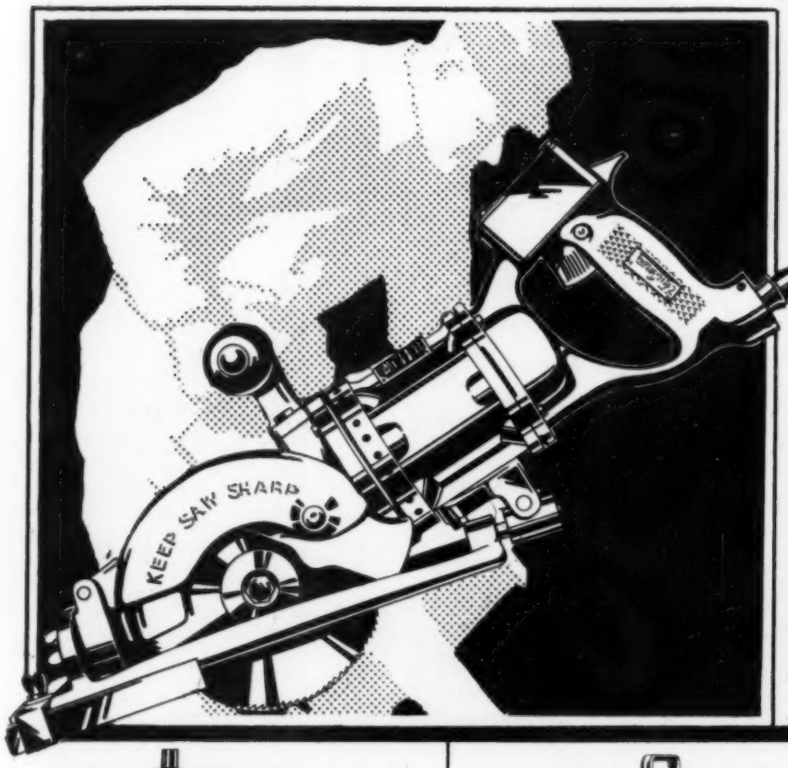
*District Offices:* New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis.

*Pacific Coast Distributor:* Pacific Coast Steel Corporation, San Francisco, Los Angeles, Portland, Seattle, Honolulu.

*Export Distributor:* Bethlehem Steel Export Corporation, 25 Broadway, New York City.

# BETHLEHEM

# Use "Van Dorn" Portable Electric Tools for Fast, Dependable Work



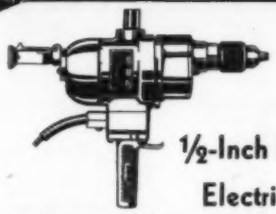

## Van Dorn Electric Saws Are Six Times as Fast!

HERE is a Portable Electric Saw that is ideal for all types of building work, large construction jobs, repair work, etc.

Built in three sizes—6″, 8″ and 10″—ball, bearings throughout, with chrome nickel shafts and gears.

Powerful Universal Motors use A. C. or D. C. Table adjustable for 0° to 45° bevel cutting and other special sawing operations. By using the proper blade or abrasive disc these saws will also cut light metal, slate, marble, asbestos, tile, transite and porcelain.

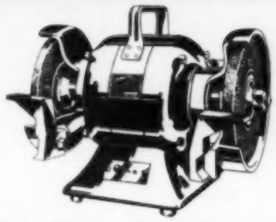
Special safety features include an automatic telescoping guard. Complete with combination rip and cross-cut blade, adjustable saw fence, three-conductor cable with safety wire for grounding, and convenient carrying case with handle.



### ½-Inch Portable Electric Drill

Designed and built for hard, constant use, the Van Dorn ½ inch Drill is widely used in construction work. Weighs only 12½ pounds. Very easy to handle yet extremely powerful. Great power plus low spindle speed makes this an ideal tool for all general construction drilling up to ½ inch. Universal motor operates on A. C. or D. C.

Other Van Dorn Drills are available in sizes from ¼ inch to 1½ inch—for every drilling operation.



### 6-Inch Electric Bench Grinder

A powerful, sturdy grinder, perfectly suited to general grinding, buffing and tool sharpening. Finely balanced construction eliminates vibration and reduces wheel wear. Conveniently portable. Complete with coarse and fine grinding wheels, tool rests, cable, attachment plug, electric switch and special rubber feet. 7″ and 10″ Grinders also available.

### Fast Portable Electric Hammers

Sturdily made and very powerful, yet light in weight and easily handled. Made in three sizes, suitable for drilling in brick and concrete, light steel chipping and driving wood-working chisels—wherever hammering action is needed. Remarkably fast and useful in many ways on construction jobs. Blows are struck at rate of several thousand per minute.

Fitted with Universal Motors operating on A. C. or D. C.

*See the Complete Van Dorn Line at Your Jobber's*

**For Power specify**

"Van Dorn"

The VAN DORN ELECTRIC TOOL CO.
TOWSON, MARYLAND, U.S.A.

C.M. 12-30

The Van Dorn Electric Tool Co.
Towson, Maryland, U. S. A.

Send literature describing Van Dorn Electric Tools.

NAME.....

ADDRESS.....

JOBBER'S NAME.....

# *The* LATEST OUTSTANDING *will shine at the*

INSPECT Byers new ⅜ yd. ¾ circle shovel and crane. See its fine, rugged construction, adapted from finest big shovel design. Get better acquainted with the many ways this rig is able to produce for you out in the field.

The Excavator has proved its worth to contractors all over the United States because it performs just like they want it to—with fast 4-speed travel, independent steer, independent all-cable crowd, finger touch clutches, self locking worm boom hoist, all shaft assemblies held in unit steel castings, Timken bearings, plenty of power from the 36 h. p. motor. Weight only 10 tons complete with attachment.

See this latest outstanding shovel and crane at the 1931 Road Show at St. Louis, January 10 to 16 in Booth AR 14.

*See the Excavator in Booth* AR 14 *at the* 1931 *Road Show*

**BYERS**

THE BYERS

# *light* SHOVEL *and* CRANE 1931 ROAD SHOW

*Clearing up right-of-way (above view) for 800-mile 8-inch gasoline pipe line from Berger, Texas to East St. Louis, Illinois, with Byers Excavator leading the way every day.*

*Clamshell Excavator digging million-dollar pumping station (left view) on oil pipe line from Texas to Pennsylvania.*

# EXCAVATOR

**EXCAVATOR CO., RAVENNA, OHIO**

# Greetings

*from*

## American Steel & Wire Company

Again the Yuletide, with its inspirations of good cheer is with us—the New Year approaches—and we sincerely extend to you our very best wishes for a very

MERRY CHRISTMAS and a
HAPPY, PROSPEROUS
NINETEEN THIRTY-ONE

You Can Depend Upon
AMERICAN
STEEL & WIRE COMPANY
WIRE ROPE

## AMERICAN STEEL & WIRE COMPANY

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

208 S. La Salle Street, Chicago — 30 Church Street, New York

*Other Sales Offices:* Atlanta Baltimore Birmingham Boston Buffalo Cincinnati Cleveland Dallas Denver Detroit Kansas City Memphis Milwaukee Minneapolis-St. Paul Oklahoma City Philadelphia Pittsburgh Salt Lake City St. Louis Wilkes-Barre Worcester

*Pacific Coast Distributors;* Columbia Steel Company, San Francisco Los Angeles Portland Seattle Honolulu

*Export Distributors:* United States Steel Products Co., 30 Church St., New York City

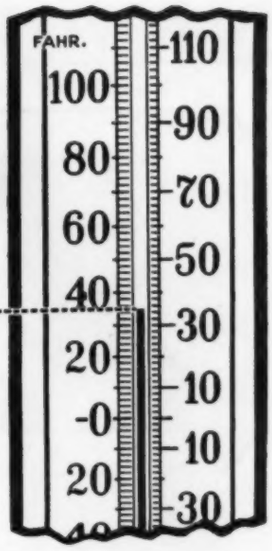
# WINTER WATERPROOFING and DAMPPROOFING

—to rush them *with safety* use

## HEADLEY EMULSIFIED ASPHALTS

***Cold surfaces chill hot-applied asphalts before they can bond—freezing ruins clay-suspended asphalts unless they are loaded with anti-freeze compounds which affect the protective properties of the finished coating. Cut-back asphalts invite trouble at all times on account of the dangerously flammable ingredients. With Headley Emulsified Asphalts Winter Waterproofing or Dampproofing can proceed except under extremely adverse conditions since these asphalts are not harmed by freezing.***

These days are all work days with HEADLEY *Emulsified* ASPHALTS




—and these days never injure the raw material

### PRINCIPAL USES

Dampproofing and waterproofing of foundations, basements, tunnels, reservoirs, sumps, pits, cisterns, vats, tanks, floors, walls, roofs, etc.

Protection of concrete and masonry against disintegration.

Protective coating of concrete, masonry, structural steel, pipe lines, metal, etc., against the destructive influences of fresh and salt water, moisture, gases, chemical fumes, brine, acids and alkalies, etc.

Bonding and cementing bituminous flooring, linoleum, plaster, stucco, tiles, blocks, slabs, bituminous bridge and crossing planks, fibrous and mineral wall boards, cork board and other insulation, etc.

Paving and patching of highways, walks, airport runways, railway platforms and crossings, industrial floors, etc.

Marking lines for highway traffic zones.

HEADLEY EMULSIFIED ASPHALTS pour, apply and bond perfectly down to almost freezing temperatures. Even though applied during cold Winter weather, the bond, imperviousness and uniformity of the finished coating are unimpaired. Nor is heated storage of the material necessary.

This perfect performance in cold weather, this ability to withstand freezing and thawing without impairment is a life-saver to many a contractor on a rush Winter job. Headley Emulsified Asphalts can be applied with equal facility Summer or Winter. No skill, tedious mopping or antiquated heating plant are required.

If you wish to know what Headley Emulsified Asphalts have done or will do under given conditions, or if you desire suggestions and specifications on a given job, give us the details, or ask for Bulletin No. 330 on Waterproofing, Dampproofing and Protective Coatings.

***Get this FREE SAMPLE and see for yourself***

***Headley Emulsified Asphalts are shipped in tank cars, 50-55 gal. or 30-33 gal. drums or 5-gal. and 1-gal. steel pails. Ask for quotation and coverage data.***

HEADLEY EMULSIFIED PRODUCTS COMPANY
Emulsified Asphalts for Industrial Uses. Largest Exclusive Manufacturers since 1908.
Franklin Trust Bldg., PHILADELPHIA
Branch Offices: New York and Chicago Works: Marcus Hook, Pa.

☐ Send Bulletin 330 on Waterproofing, Dampproofing and General Protective Coating.
☐ Send sample of Headley Emulsified Asphalt.

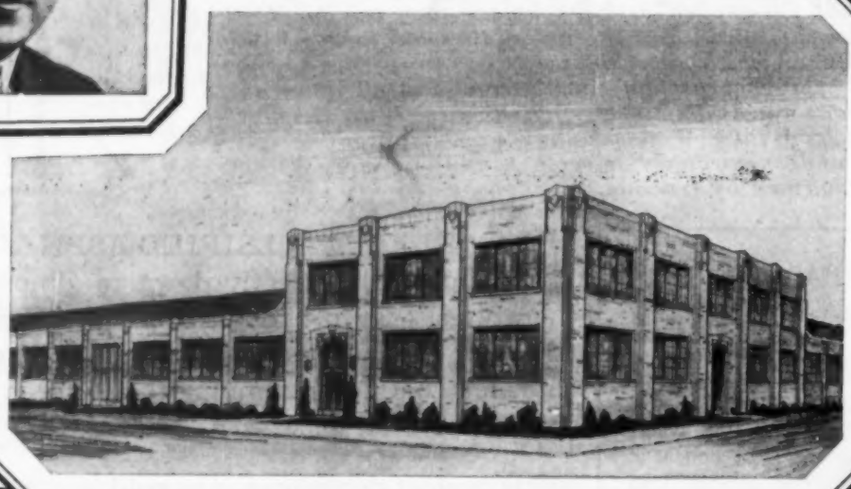
Name .....

Address .....

.....

CM

# "Judge for Yourself Don't You See That . .



Above—Mr. R. Gillespie, President and Treasurer of Mill & Mine Supply Company of Seattle, Washington. This company's services are of a definite economic value to the prosperity of its business territory.

**THERE is no more direct route for merchandise to flow in than through houses of our kind. Regardless of the name or type of distributor they must absorb our functions and our costs of selling. Our strength and value is predicated on the common sense way in which this point is viewed."**

The above statement is characteristic of those made by prominent distributors all over the country. It explains in part how the Industrial Supply Distributor, helping to solve the important problem of broad markets and economical distribution, upholds high quality, maintains fair prices and saves needless efforts on the part of both consumer and manufacturer.

Invader Belting is as old as is Republic ( 28 years. ) Invader will work satisfactorily anywhere, except on abnormal drives calling for super quality such as is in Champion High Speed.

*Send for a sample of*
INVADER

**THE REPUBLIC RUBBER CO.**

**Youngstown Ohio**

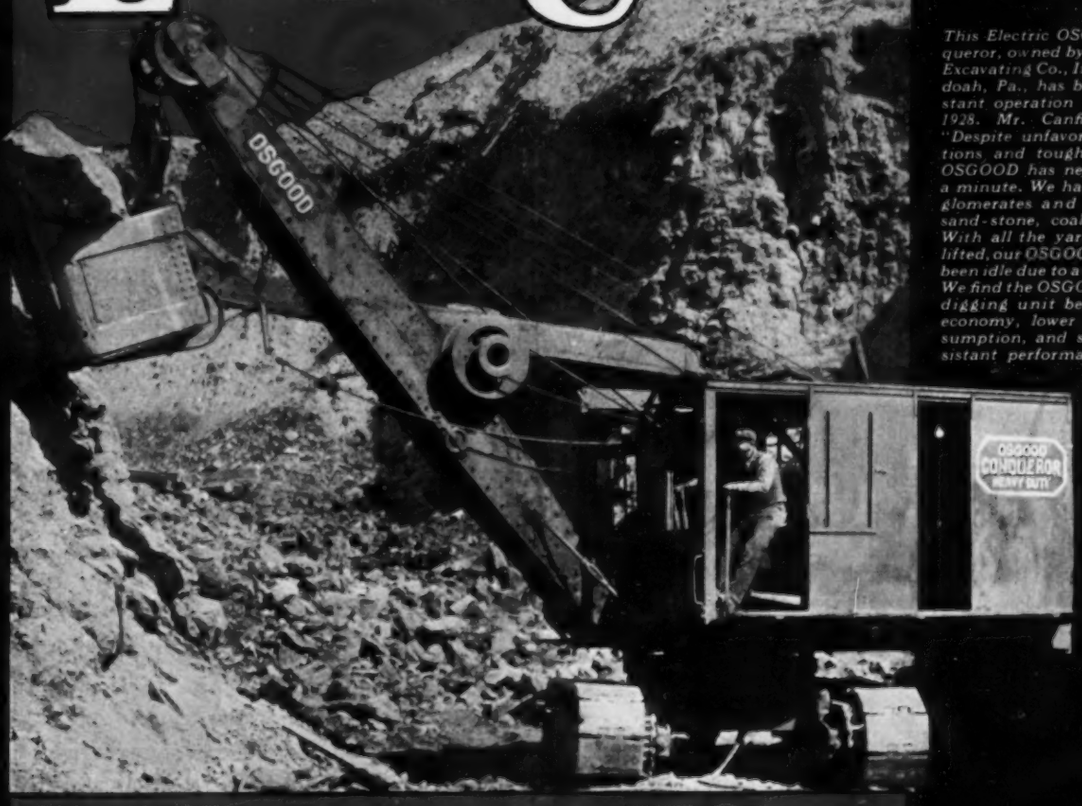
**REPUBLIC means the Best Mechanical Rubber Goods**

# Electric

3/4 TO 6 YARDS

COMMANDER
CONQUEROR
VICTOR
RAILROAD

GASOLINE STEAM
ELECTRIC
DIESEL




*This Electric OSGOOD Conqueror, owned by The Brown Excavating Co., Inc., Shenandoah, Pa., has been in constant operation since Sept., 1928. Mr. Canfield writes: "Despite unfavorable conditions and tough going our OSGOOD has never faltered a minute. We have dug conglomerates and blue-rock, sand-stone, coal and clay. With all the yardage it has lifted, our OSGOOD has never been idle due to a breakdown! We find the OSGOOD an ideal digging unit because of its economy, lower power consumption, and steady, consistant performance."*

## SINGLE ELECTRIC MOTOR DELIVERS SMOOTH, QUIET, STEADY, POWER

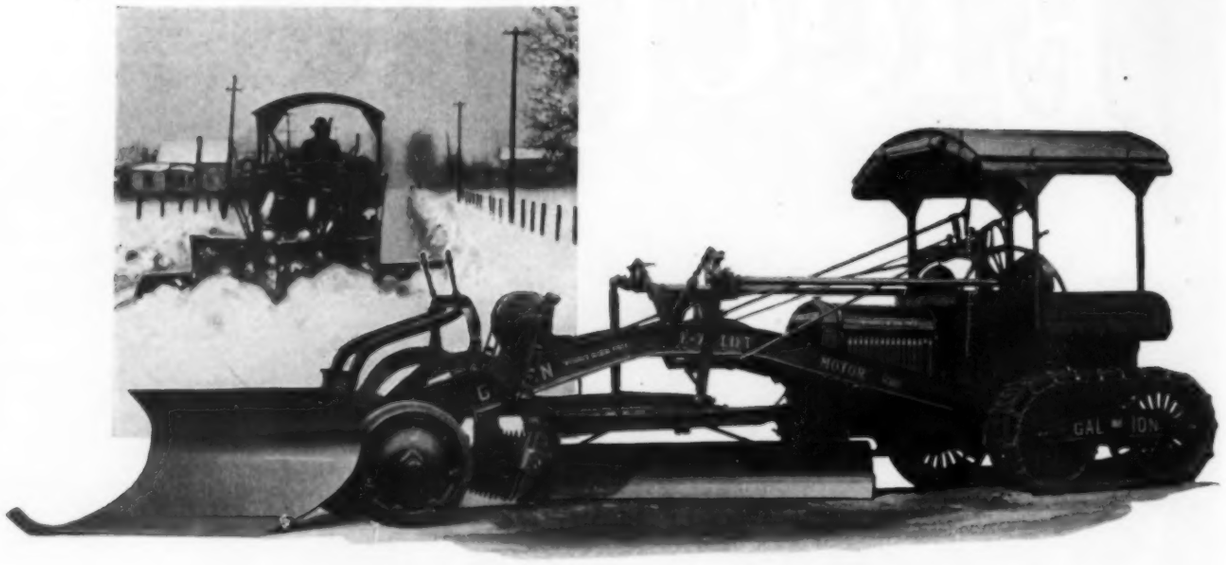
In the Electric OSOOOD digging efficiency reaches perfection! Undivided power for swinging, hoisting and crowding flows smoothly and quietly from a *single electric motor*. Single power source eliminates the use of three smaller motors, enabling the operator to concentrate the entire motive force on each single operation. Less machinery to care for—faster digging—more power for each operation—freedom from breakdown—simple to control. Wherever A.C. or D.C. current is available we recommend the Electric OSGOOD as the cheapest, fastest, most efficient digging tool in the world. The same clutch used on the Gasoline OSGOOD is used for disconnecting the electric motor from operating machinery. The motor starts under "no load" without drawing heavy line current. Write for more information on the Electric OSGOOD!

*The Electric OSGOOD differs from OSGOOD gasoline driven machines in power plant and accessory equipment only. Current is taken in at the truck and to the upper body through distributor rings and self-adjusting brushes. Convenient fittings are provided on each end of the truck for electrical connection. Start-switch and safety cut-out switch are mounted on neat panelboard. Overload and no-voltage relays give complete protection.*

THE OSGOOD CO.

MARION OHIO

# NO SNOW-BOUND ROADS



## with a GALION SNOW PLOW on the Job

### Galion Distributors

W. A. Adams Tractor & Equip. Co., Raleigh, N. C.
R. S. Armstrong & Bro. Co., Atlanta, Ga.
O. B. Avery Co., St. Louis, Mo.
Badger Tractor & Equip. Co., Milwaukee, Wis.
W. D. Banker Road Machy. Co., Memphis, Tenn.
Banks-Miller Supply Co., Huntington, W. Va.
Borchert-Ingersoll, Inc., St. Paul, Minn.
Brown-Fraser & Co., Ltd., Vancouver, B. C.
Dukehart Machy. Co., Des Moines, Iowa
Eastern Tractor Co., Portland, Me., Cambridge, Mass.
Feenaughty Machy. Co., Portland, Ore.
Frankfort Equip. Co., Frankfort, Ky.
Good Roads Machy. Co. of N. Y. Inc., New York
Hall Perry Machy. Co., Butte, Mont.
Herd Equip. Co., Oklahoma City, Okla.
Interstate Machinery & Supply Co., Omaha, Nebr.
Jeffrey Mfg. Co., Ltd., Montreal, Que.
Jenison Machy. Co., San Francisco, Cal.
C. H. Jones Co., Salt Lake City, Utah
Lewis-Patten Co., San Antonio, Texas
Lewis Tractor & Machinery Co., Fargo, N. D.
Miller & Requarth, Springfield, Ill.
Morrow Auto Co., Albuquerque, New Mexico
H. W. Moore Equip. Co., Denver, Colo.
Morrisey Easton Tractor Co., Vicksburg, Miss.
Murphy & Murphy, Little Rock, Ark.
Northfield Iron Company, Northfield, Minn.
C. T. Patterson Co. Inc., New Orleans, La.
G. C. Phillips Tractor Co. Inc., Birmingham, Ala.
Power Equip. & Service Co., New Haven, Conn.
F. Ronstadt Co., Tucson, Ariz.
Salina Tractor & Thresher Co., Salina, Kan.
Bert Smith, Enid, Okla.
Smith-Booth-Usher Co., Los Angeles, Cal.
Standard Road Equip. Co., Rockford, Ill.
W. H. Stoutenburg, Penn Yan, N. Y.
Tennessee Tractor Co., Nashville, Tenn.
F. E. Vaughn, LaCrosse, Kan.
Richmond Machy. & Equip. Co., Richmond, Va.
Welch Good Roads Supply Co., Welch, W. Va.

Roads are quickly cleared of snow and kept clear wherever a Galion Motor Grader Snow Plow is on the job. Powered by the famous McCormick-Deering 10-20 Industrial Tractor with Galion Sure-Trac Rubber Crawler, there is ample power and traction to move snow rapidly.

The snow plow opens a six foot path which the blade widens, at the same time moving the snow to the outside of the road. A runner is placed at the front to carry the plow over obstructions. Relief springs permit this action, yet hold the plow to its work. The deeply curved blade, which rolls the snow in a great furrow, can be set at any angle sharp enough to move snow easily, clearing a wide track.

Removing the snow plow and changing the blade converts the machine into a motor patrol grader unmatched in strength and performance. A dual-purpose machine, giving all year service.

Full particulars upon request

## The Galion Iron Works & Mfg. Co.
## Galion - - - - - Ohio

STRUCTURAL STEEL CREATED THE SKYSCRAPER

# TO INDUSTRY STEEL BRINGS BRAWN

"AN INDUSTRIAL DEVELOPMENT"—IMAGINATIVE DESIGN BY HUGH FERRISS. AN ENLARGEMENT, ON SPECIAL STOCK FOR FRAMING, WILL BE MAILED WITHOUT CHARGE TO ANY ARCHITECT, ENGINEER OR BUSINESS EXECUTIVE.

STEEL is the modern beast of burden . . . long proved best fitted to shoulder the world's work. In its clean, compact sinews is equal resistance to tensile, compressive and shearing stress. Steel, the strongest building material known to man, can have no hidden weaknesses . . . it is worked and reworked at the mills, rolled and rerolled, tested and tested again.

In industrial plants, steel withstands the incessant vibration of flashing machines and the changing stresses of constantly shifting loads. It is elastic and tough. It is the only material that can be depended upon to recover fully when loads are removed or shocks cease.

Steel offers the same great strength, resilience and permanence to small factories, to small apartment and mercantile houses, to homes, schools, and small as well as mammoth bridges. It saves building time, provides more floor space. It is most economically erected in any climate—any weather—wherever and whenever men can work.

Before building anything find out what steel can do for you. The Institute serves as a clearing house for technical and economic information on structural steel, and offers full and free co-operation in the use of such data to architects, engineers and all others interested.

The co-operative non-profit service organization of the structural steel industry of North America. Through its extensive test and research program, the Institute aims to establish the full facts regarding steel in relation to every type of construction. The Institute's many publications covering every phase of steel construction, are available on request. Please address all inquiries to 200 Madison Avenue, New York City. Canadian address: 710 Bank of Hamilton Bldg., Toronto, Ontario. District offices in New York, Worcester, Philadelphia, Birmingham, Cleveland, Chicago, Milwaukee, St. Louis, Topeka, Dallas, San Francisco and Toronto.

## AMERICAN INSTITUTE OF STEEL CONSTRUCTION

STEEL INSURES STRENGTH AND SECURITY

*High-Early-Strength concrete approaches to garage and gasoline tanks of Epley Garage Co., Gettysburg, Pa. Universal Atlas methods and cement used. Peters Cement Products Co., Gettysburg, contractor.*

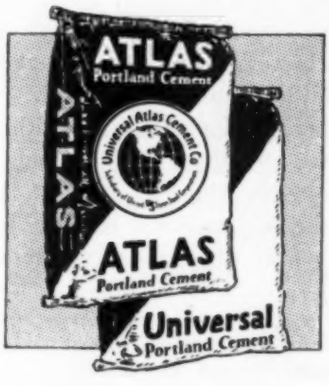
# *Traffic travels this concrete*

## TWO DAYS AFTER PLACING

● ● ● This garage and filling station is located at a stopover point for all overland busses using the Lincoln Highway in the East. New concrete drives to the pumps and into the garage were needed. For business reasons the owners did not want to tie up the station for a longer time than necessary.

By using high-early-strength concrete made with Universal Atlas methods and cement and by curing it with wet burlap, the contractors were able to open the pavement to traffic two days after placing. This two-day concrete reduced to a minimum the time the gasoline pumps were tied up.

High-early-strength concrete, made with Universal Atlas methods and cement, is used for concrete work which calls for speed, greater strength, watertightness and durability. A booklet containing the methods for obtaining it will be sent on request. . . . . .




MINNEAPOLIS
DULUTH
ST LOUIS
KANSAS CITY
DES MOINES
OMAHA
OKLAHOMA CITY
BIRMINGHAM
WACO

**Universal Atlas Cement Co.**

*Subsidiary of United States Steel Corporation*

Concrete for Permanence

CHICAGO
NEW YORK
NEWARK
PHILADELPHIA
BOSTON
ALBANY
PITTSBURGH
CLEVELAND
COLUMBUS

47

# Construction Methods

A McGraw-Hill Publication—Established 1919

ROBERT K. TOMLIN, *Editor*

VOLUME 12 NEW YORK, DECEMBER, 1930 NUMBER 12

## *Special Car Body Holds* 20 Cu.Yd. of Rock

TO DELIVER rock for facing the Salt Springs dam in California (see *Construction Methods,* June, p. 34), the Pacific Gas & Electric Co. has developed a 20-cu.yd. end-dump body mounted on railroad trucks. The unit is of rugged, all-steel construction with wearing strips of Tuftus steel on bottom and sides.

The car body weighs 7½ tons, and carries a load of 30 tons of rock when filled to its 20-yd. capacity. Its dimensions are: Length, 14 ft.; width between tops of sides, 11 ft. 3 in.; depth, 3 ft. Loading of rock is done by 4-yd. power shovels.

To elevate the body for end-dumping a pair of 8-in. two-sleeve Commercial hoists are fed with oil under pressure by a gear pump direct connected to an electric motor hung on the main car frame and supplied with power through a cable plugged into a receptacle on the car by the dump-man, who starts the motor by a push-button switch. Dumping time is 25 sec.

The car was designed by P. F. Schneider of the Mutual Engineering Co. and O. W. Peterson, P. I. Kurtz and Hector Keesling of the Pacific Gas & Electric Co.

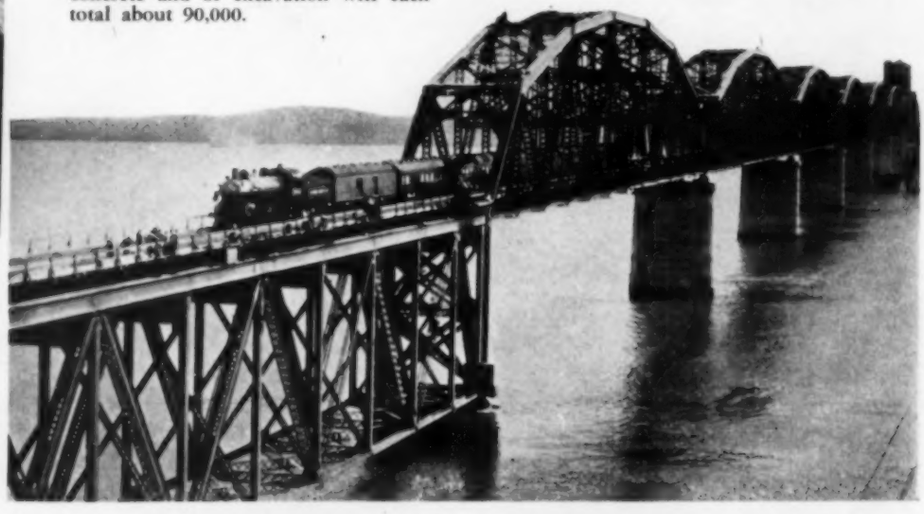
The Salt Springs dam is 328 ft. high and involves a total volume of 3,000,000 cu.yd. of rock fill.

LONGEST HIGHWAY BRIDGE of multiple-arch concrete type, spanning Susquehanna River between Columbia and Wrightsville, Pa., is completed by Wiley-Maxon Construction Co., of Dayton, Ohio, in time for dedication on Armistice Day, Nov. 11, 1930, as World War memorial. Structure is 7,374 ft. in length and comprises 28 three-rib arches, each with a clear span of 185 ft., and 20 shorter girder spans for land approaches. James B. Long, consulting engineer, of Norristown, Pa., designed structure for counties of York and Lancaster.

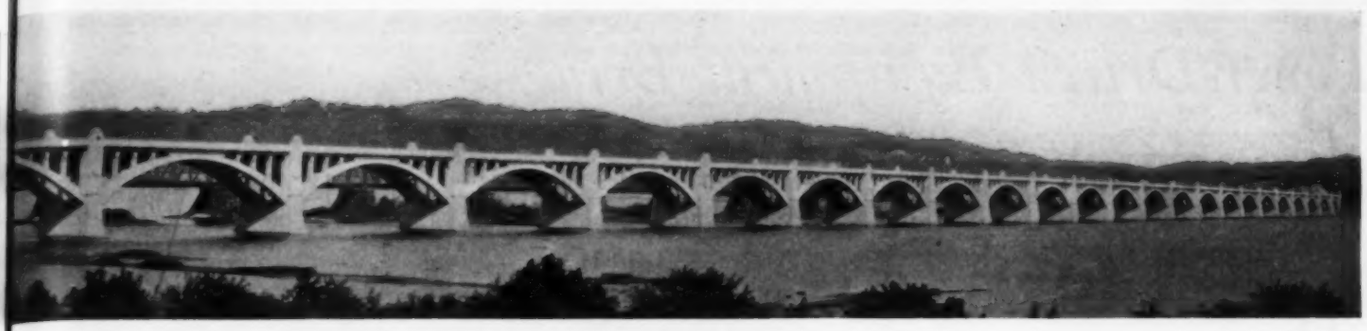
# *This Month's* NEWS REEL

MAIN STEEL TOWER of St. Johns suspension bridge across Willamette River at Portland, Ore., is 350 ft. high above mean low water. Completed bridge will have clearance of 205 ft. above river channel. Foundation contractor, Gilpin Construction Co.; steel erection, Pomeroy & Co.; consulting engineers, Robinson & Steinman of New York.

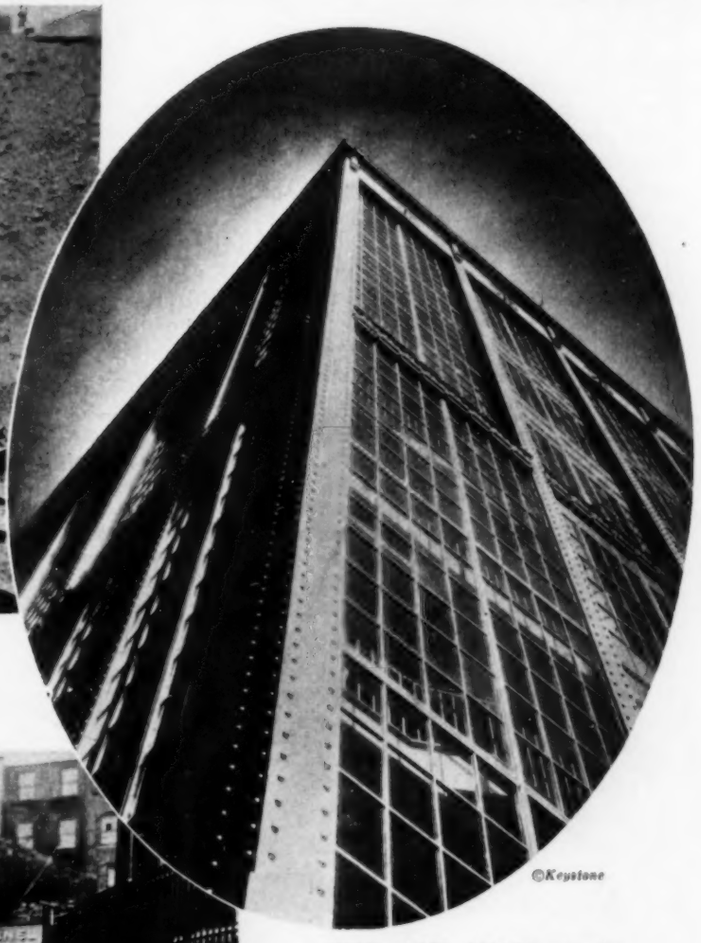
BIG TUJUNGA DAM, of variable-radius arch type, 249 ft. above lowest point in foundation, is under construction by Edwards, Wildey & Dixon, contractors, for Los Angeles County Flood Control District, E. C. Eaton, chief engineer. Yardage of concrete and of excavation will each total about 90,000.



FIRST REGULAR TRAIN crosses Southern Pacific Railway's $12.000,000 Suisun Bay bridge at Martinez, Calif. Structure supersedes old train ferries. Contractors were Siems, Helmers & Schaffner, Inc., for substructure and American Bridge Co. for steel erection.



AT OWYHEE DAM, on U. S. Bureau of Reclamation project in Oregon, General Construction Co., of Seattle, delivers concrete for 522-ft. high structure in 8-yd. buckets delivered by 1,300-ft. cableway.




STEEL AND GLASS are the materials used to construct this unusual building for the Worcester (Mass.) Pressed Steel Co. from designs by J. D. Leland & Co., architects and engineers of Boston.

INTERNATIONAL TUNNEL, linking United States and Canada by mile-long subaqueous route with 22-ft. roadway, is opened to traffic between Detroit, Mich., and Windsor, Canada. Bus is emerging on American side of Detroit river crossing, built by floating and sinking to place long sections of giant steel and concrete tube. Parsons, Klapp, Brinckerhoff & Douglas were the consulting engineers.

# *Power-Driven Equipment Brings*

# SPEED *and* ECONOMY

## *to Large Concrete Flume Job*

WITH the aid of equipment specially adapted to the job, a reinforced concrete flume 18¾ miles long, 14 ft. wide and 7 ft. deep is being built at high speed in northern California by the Pacific Gas & Electric Co. as part of the Mokelumne River development program of which the Salt Springs dam, described in *Construction Methods* for June, 1930, is a major feature.

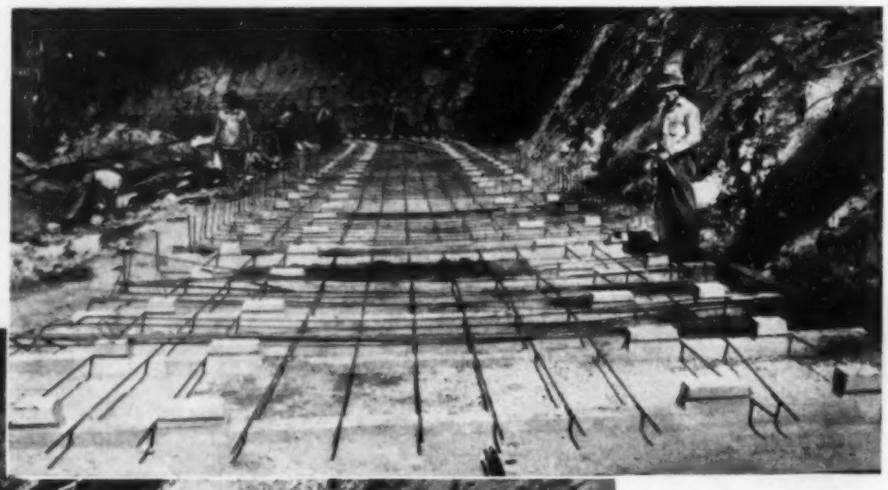
Realizing from the inception of the scheme that construction problems would be all-important on this job, O. W. Peterson, the company's engineer of general construction, and his assistant, Hector Keesling, began to work out construction methods three years ago. Little by little, supported by a broad construction experience, ideas, methods and equipment have been developed so that when construction actually was commenced the plan of operations was put into effect with a minimum of delay and "grief." Practically all the equipment is power-driven, units are interchangeable as far as possible and plans have been worked out so that the whole operation can proceed with a minimum of interference.

*Concrete Ties*—First a bench cut is excavated with power shovels. This has been done partly by contract and partly with company forces. After the grade is rolled with a 10-ton roller, forms are laid for transverse concrete ties on 4½-ft. centers and this concrete is poured early so it will be well set before needed for supporting a timber roadway.

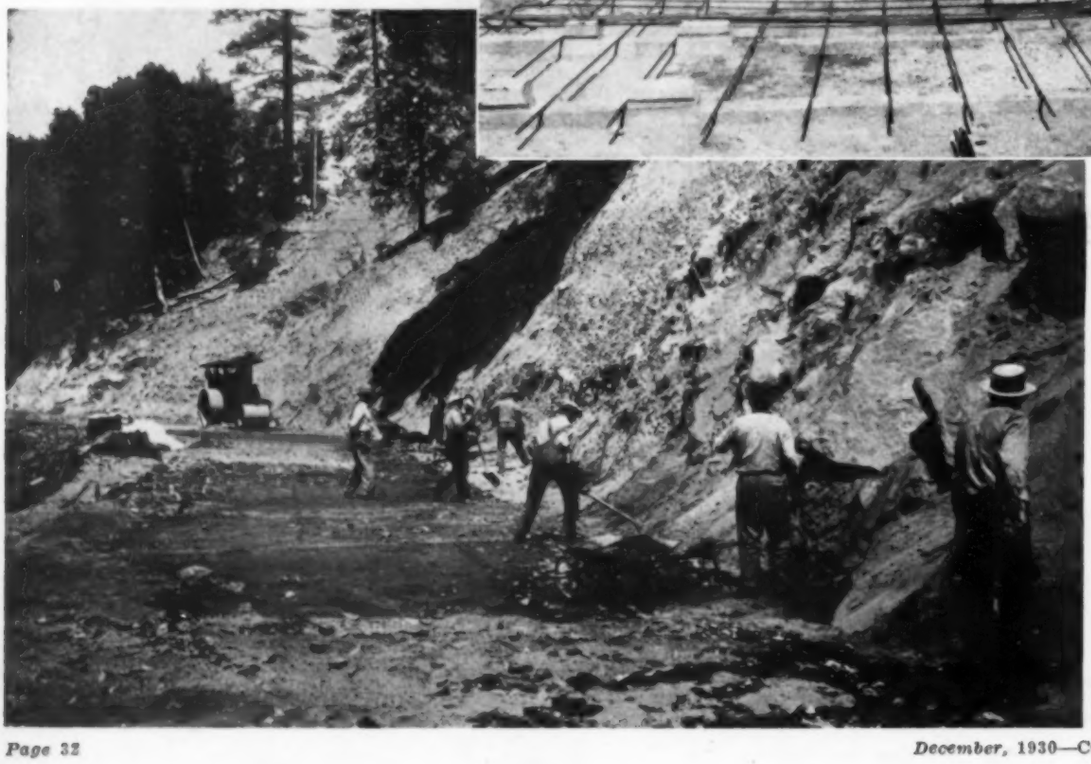
Each tie is cast with four rectangular projections on its upper side. The surface of these projections is set at grade for the bottom of the flume floor. A groove, cast completely around these projections, provides a bond with the flume bottom when it is poured. The two outer projections carry the inside steel forms for the flume walls. The inner projections which are provided with dowel holes serve as pedestals for supporting the temporary elevated floor system carrying rails for the jumbos and a plank track for the trucks.

Complete batching plants are set up at four points along the canal grade. At these plants materials are proportioned for a 26-cu.ft. mixer charge and are loaded into trailers on the flume floor underneath the delivery hoppers.

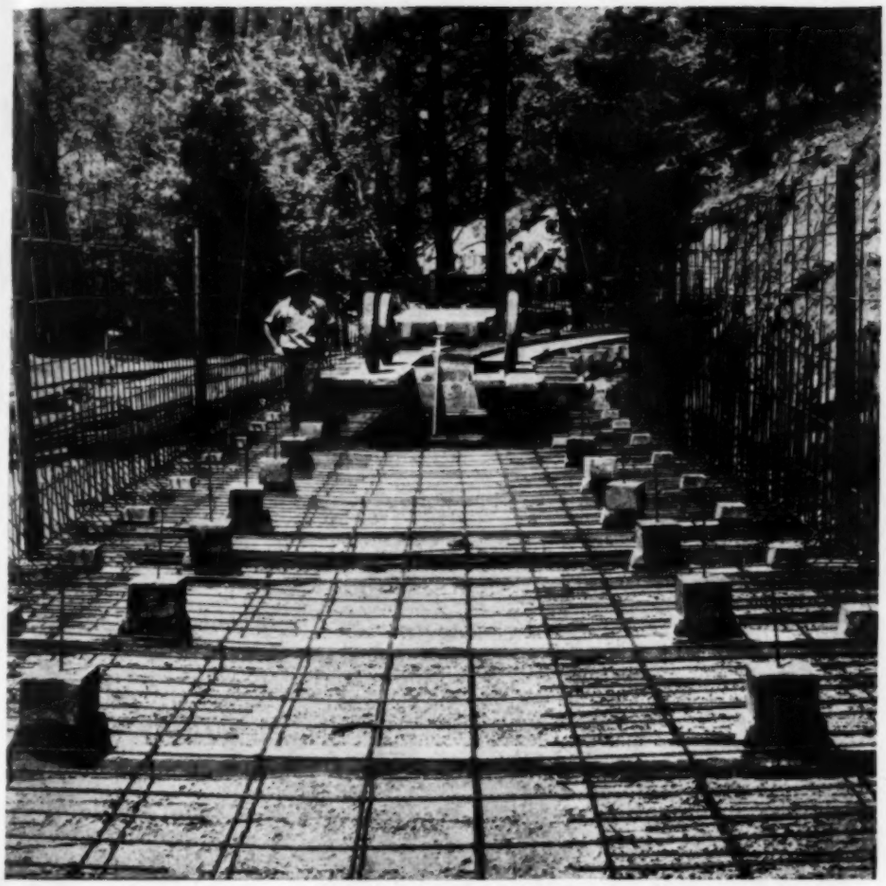
*Delivery of Concrete*—Seven trailers and a tractor constitute a train which can travel at about 10 miles per hour. The trailers are designed to track closely in both directions because the



**AFTER CONCRETE TIES WERE POURED.** Four projections on each tie mark grade level of finished flume floor. Outer projections support form panels; inner pair carry tracks.



**GRADING OPERATIONS *(left)*.** Following steam shovel, bench cut was smoothed up by hand and then rolled with 10-ton roller.



PLANK TRACK CONSTRUCTION. Note wooden spacer blocks on pedestals that support track. Rails for jumbo are to be laid outside plank track.

either to a hopper directly beneath, from which the floor of the flume is poured, or to either or both of two belt conveyors which deliver concrete to hoppers directly over the flume sides.

The first concrete placed in the flume box is poured into the side forms and, under the action of the tampers, fills the beveled space at the bottom of the inside form and flows over the subgrade for a foot or more inside the wall forms. Concrete is poured in the walls thus until they are about half full, the jumbo meantime moving back and forth along the 60-ft. section in which concrete is being poured. Leaving the side walls for the time being concrete is then delivered to the flume bottom where it is screeded to grade and given a trowel finish. With the bottom pour completed, concrete again is directed into the side forms until they are filled.

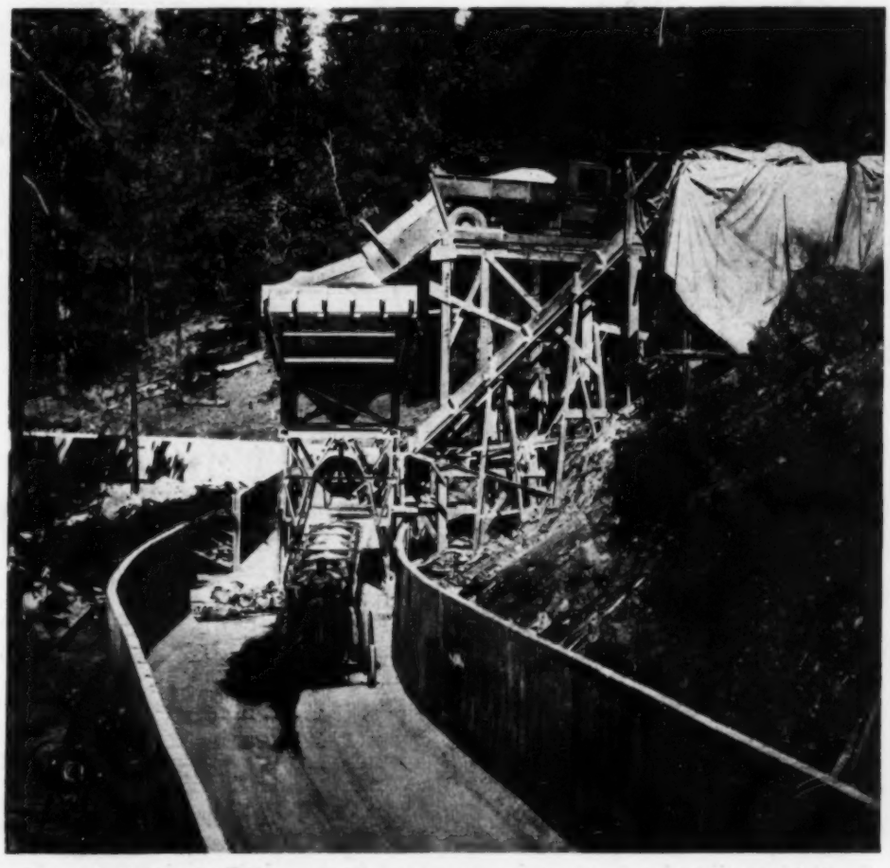
*Pouring Schedule* — The pouring schedule is the secret of success in this method of construction—it permits pouring the flume box without joints between the bottom and the side walls so that each 20-ft. section of the flume between contraction joints is a monolithic structure.

The sequence of operation is as follows: A train consisting of tractor and

plank track over fresh concrete does not permit of much width on curves and for this reason both axles of the trailers are equipped with fifth wheels. The trailer bodies are mounted on Hyatt roller bearings arranged to roll forward, overbalance and dump. The hinged end door and body are locked in position by a single lever. When the lever is moved to the vertical position the body is free to roll forward and, just before overbalancing, the operator throws the lever beyond the vertical position and the door is unlatched. This prevents dumping material outside the receiving hopper. Pneumatic tires were used to give a greater spread of load, lower unit pressures and less impact; they permit running over the concrete sooner than would have been advisable with other tires.

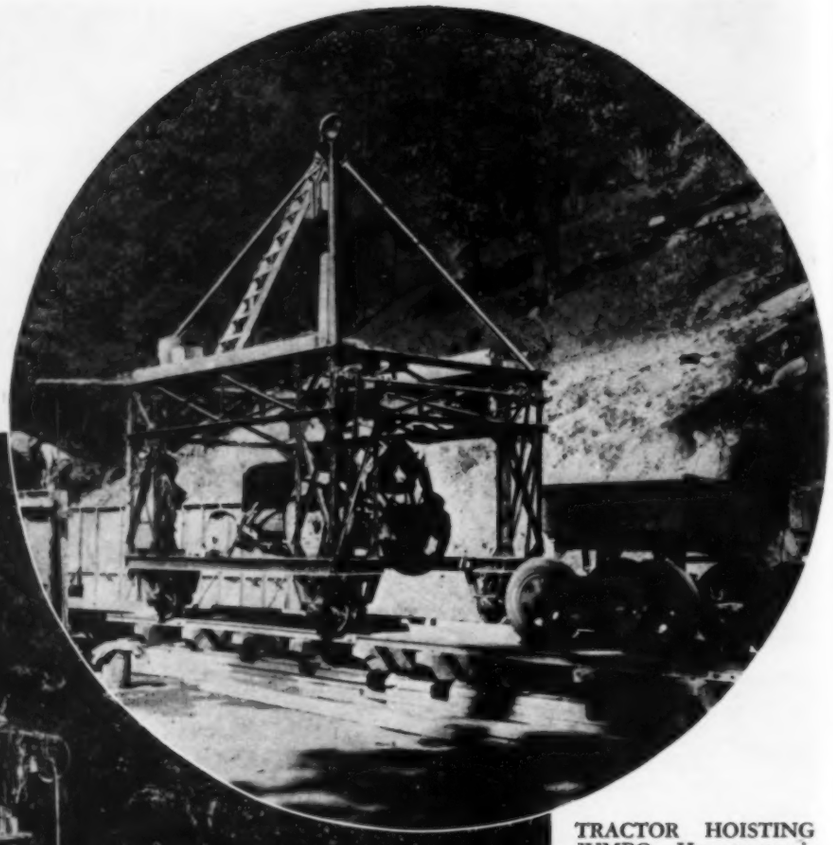
Four portable mixing plants are used and concreting operations as a whole are carried on in four separate units. The concrete jumbos stand 14½ ft. high above the rail and are about 13 ft. long. They are moved by 5-hp. motors and can advance at 30 ft. per minute. The loading hopper at the rear of the machine is operated by a 7½-hp. motor and separate motors operate the mixer and the belt conveyors.

Concrete discharges from the mixer

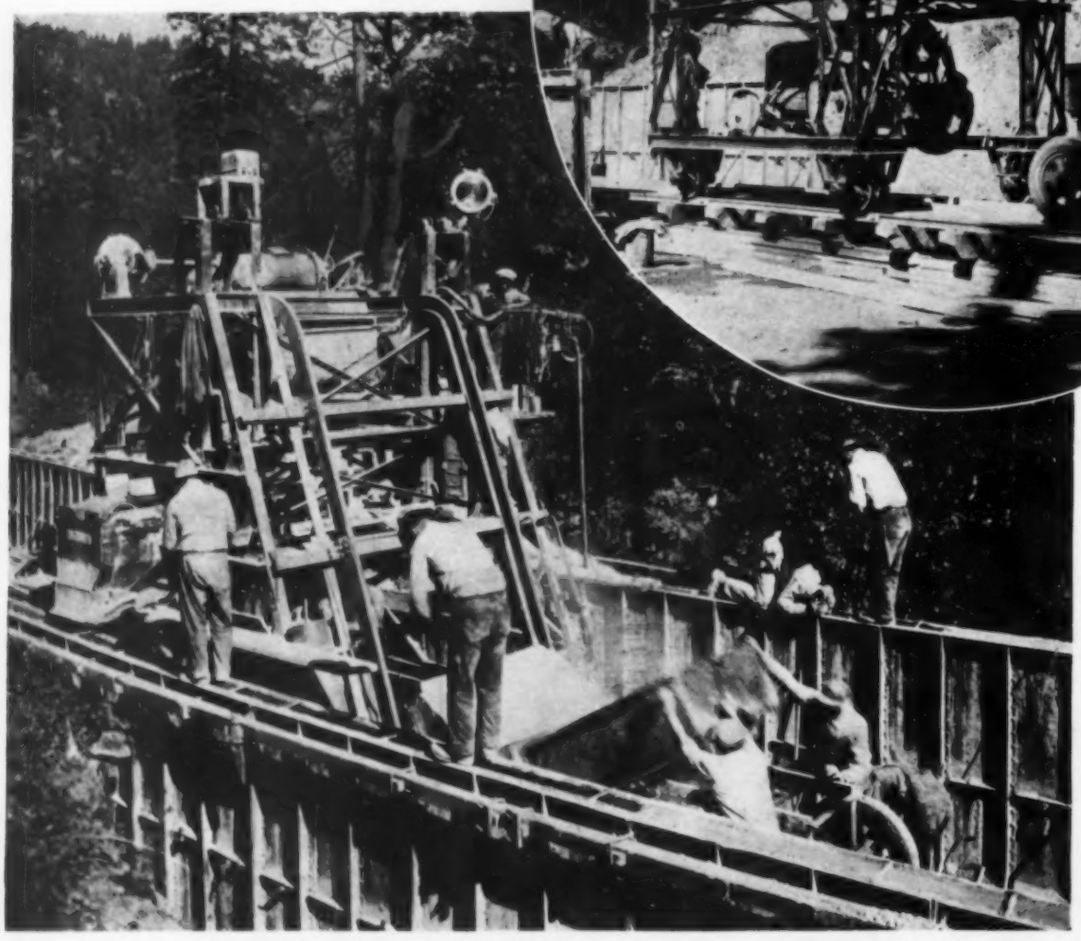


BATCHING PLANT. Motor trucks deliver materials to bins above. Full revolving scales are used. Cement is delivered in paper sacks.

trailers takes its load at the batching plant and travels along the concrete floor of the finished flume until it reaches the short stretch of flume built in the last two days. Here the train waits until a train of empties comes off the one-way elevated plank track, whereupon the loaded train moves up on this track and thence to the mixer. The tractor is cut loose and runs through the mixer jumbo to the tractor hoisting jumbo stationed just beyond. The tractor driver hooks on to the hoist in the hoisting jumbo, raises the tractor so the trailers can pass beneath it, and leaves it suspended there.



TRACTOR HOISTING JUMBO. Here tractor is being lowered to place at head of train of empties which will then pass back under mixer.



CONCRETE MIXING PLANT *(left)*. Trailer body discharging into loading hopper. Note tampers at work on wall forms.

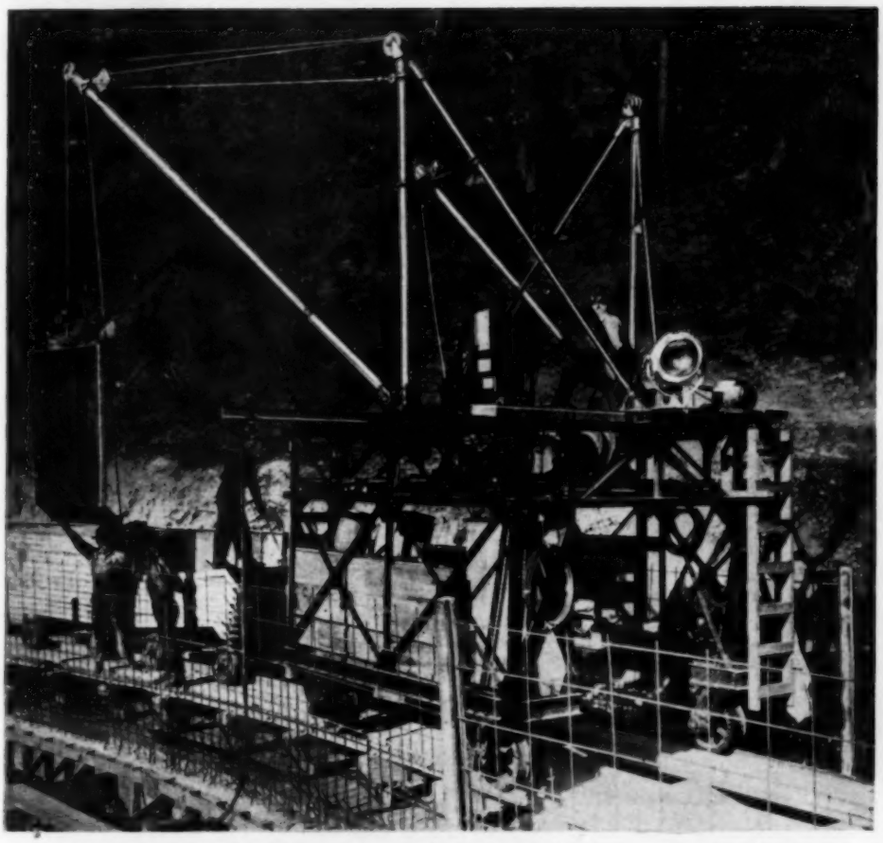
Each successive trailer is cut loose at the mixing jumbo, the load is dumped into the hopper and while the hopper is in the air the empty trailer is shoved ahead under the mixer and under the hoisted tractor. When all the trailers have delivered their loads and have been moved beyond the elevated tractor, the tractor is swung around to head in the reverse direction and is then lowered to the flume floor and connected to the head end of the empty train. The train immediately returns underneath the mixer, goes back over the plank track and makes way for the next loaded train.

Wall forms are removed in about two days and burlap is hung on both sides of the walls for two weeks thereafter. The burlap is kept wet by water from wooden troughs mounted on top of the walls or, in some cases, by ¾-in. perforated pipe.

*Form Setting Jumbos*—The form-setting jumbos are self-propelled steel frames with motor-operated derricks on each side. The derricks have 20-ft. booms and are capable of handling a 1,000-lb. load. Form stripping jumbos are similar to the form setting type but are not self-propelled. The tractor hoisting jumbos are self-propelled with steel frames, similar to but lighter than that used on the mixer jumbos. They have a 3-ton electric hoist with a hoisting speed of 32 ft. per minute and an 18-ft. lift.

All of the jumbos operate on the 8-ft. 4 in. track and have the same clearances to give thoroughfare for tractors and trailers. Power for the several jumbos is supplied at 2,500 volts in armored cables and is transformed on the jumbos to lower voltage.

When the wall forms are stripped they are placed on low bed trailers having a steel skeleton frame body 6½ ft. long by 3 ft. wide, with stake pockets on each end. Since the trailers are used on the wooden runway exclusively, they are equipped with solid rubber tires. Form panels remain on



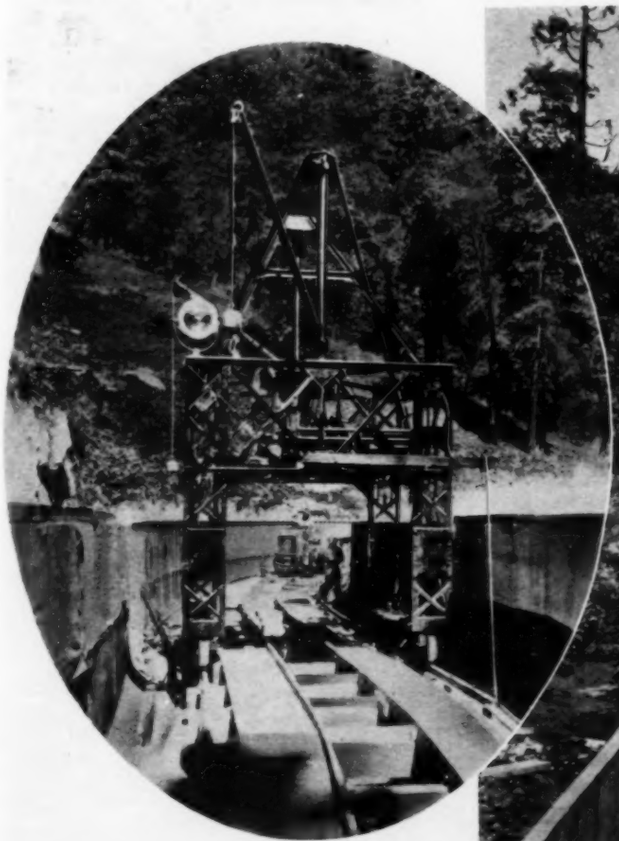
FORM SETTING JUMBO. Form panels in 5-ft. sections are taken from trailers and erected with aid of derricks. Note that this jumbo, like the others, permits tractors and trailers to pass beneath it.

the trailers between the stripping and the next setting up.

Of the four complete concreting groups, three are equipped with pneumatic-tired tractors and trailers as described in the foregoing. The fourth is served entirely with gasoline locomotives and cars on 36-in. gage track. Later, comparisons will be made as to costs and rates of progress with the two types of equipment.

Thus far the average of the three concreting units has been about 160 ft. of completed flume box per day. Excavation was started last winter and concreting was commenced in June, 1930. On Oct. 15 the job was about 30 per cent finished.

*Personnel*—The supervision of the entire job has been under Mr. Peterson's direction assisted by Mr. Keesling. P. I. Kurtz is superintendent, Salt Springs division, G. M. Wehrle is superintendent of the Tiger Creek division, J. E. Cooney is assistant superintendent and R. D. Reeve is resident construction engineer. Twelve miles of the bench excavation was done under contract by Bechtel & Palmer. The Mutual Engineering Co., San Francisco, P. F. Schneider, manager, aided in the development of mechanical details and built most of the special equipment.



FORM REMOVING JUMBO. After this jumbo passes, dismantling of track and plank roadway begins. Note burlap on side walls.

THE FINISHED JOB. This flume is 14 ft. wide and 7 ft. deep inside. 18¼ miles of it are now under construction on the Mokelumne project in northern California.

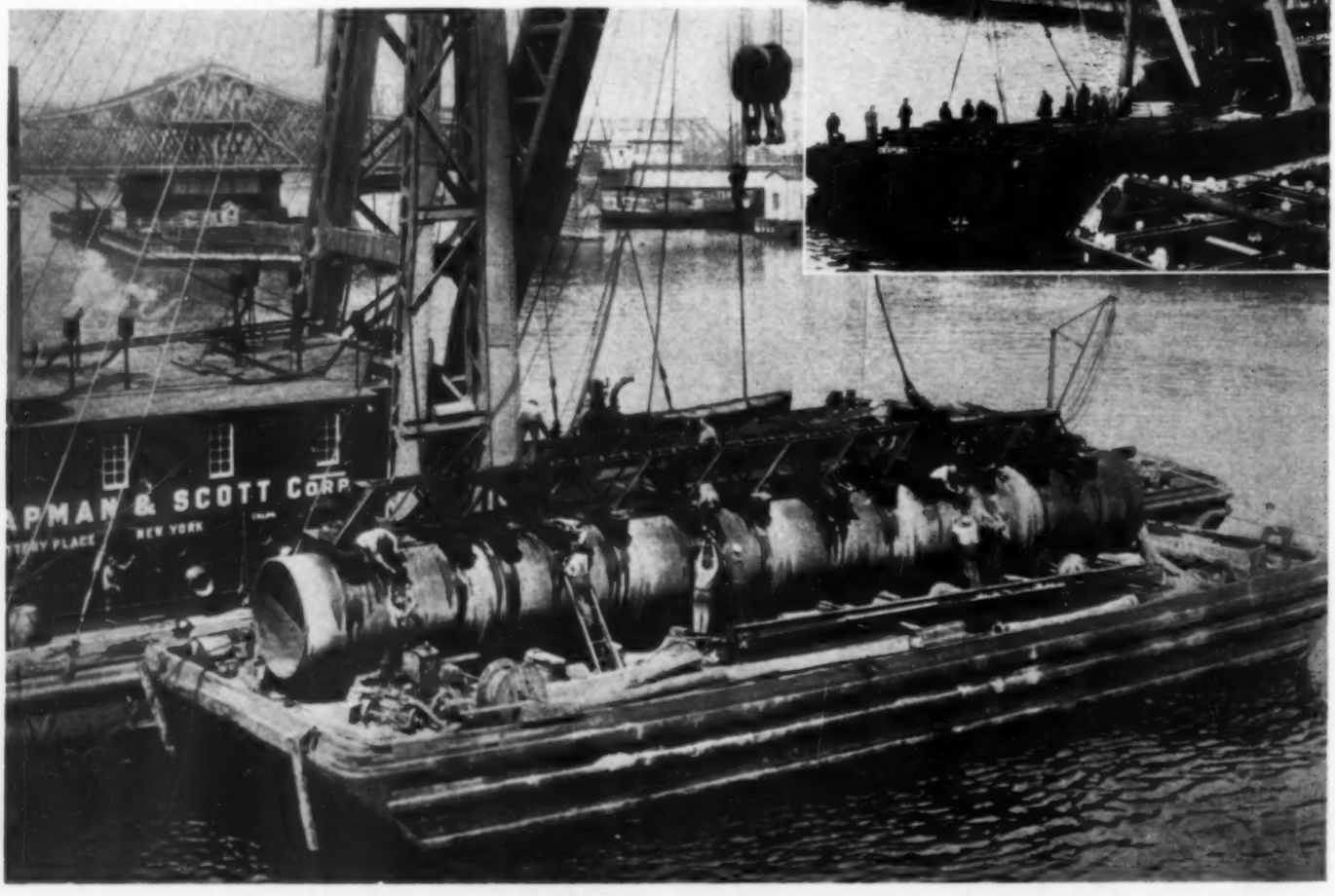
# Huge Cast-Iron Pipe Line

## *Floating Derrick Handle 78-Ton Loads of Lengths, Jointed*

FOR carrying 148 duct lines of the New York Telephone Company underneath the Harlem River at 129th St., New York, the Merritt-Chapman & Scott Corporation, working under a contract from the Empire City Subway Co., have installed a unique submarine crossing of 84-in. diameter cast-iron pipe placed in 72-ft. sections (six 12-ft. pipe lengths jointed as a unit) with the aid of a specially designed "strongback" and powerful floating derrick. The shore connections of the subaqueous pipe line are made with 105 84-in. reducers in 12-ft. lengths, each weighing 12 tons, claimed to be the largest cast-iron pipe sections of full length ever produced in the United States. The thickness of the pipe metal is $2\frac{1}{16}$ in. for the reducers and $1\frac{3}{4}$ in. for the regular 84-in. diameter pipe.

The job involved the usual difficulties encountered on submarine operations, in addition to the special problem

**DIVERS** and powerful floating derrick *(right)* handled placing of Harlem River submarine pipe line.



**STRONGBACK** is attached to six lengths of 84-in. cast-iron pipe, jointed on barge to form section 72-ft. long. Cradles on pile bents support pipe on river bottom.

# Carries Cables Under River

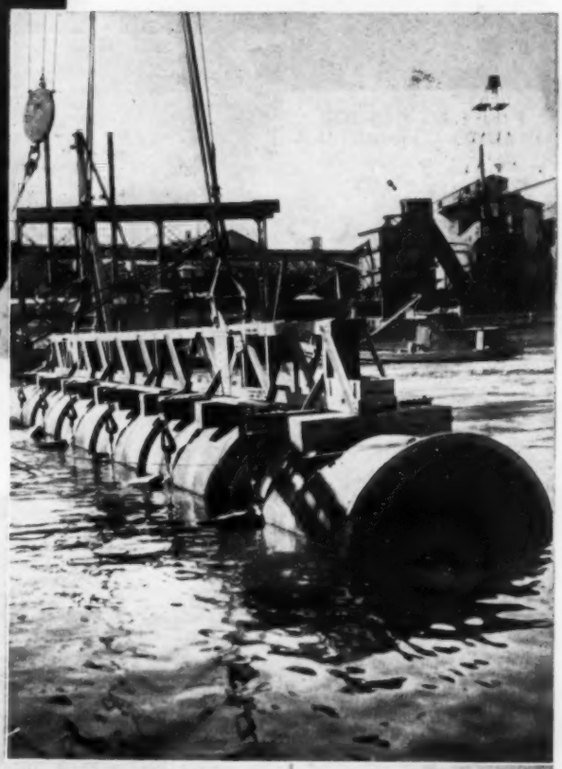
## *and Special Strongback Six 84-In. Diameter Pipe Into 72-Ft. Sections*

of handling and adjusting to a nice fit in polluted water of inky blackness loads of 78 tons, including the 72-ft. sections of jointed pipe plus the weight of the strongback to which they were lashed. The length of the crossing between the Manhattan and Bronx shore lines is 614 ft. and the depth, at low water, about 27 ft., with a 4-ft. tide variation.

The first operations consisted of dredging a trench across the Harlem River to provide a minimum depth of 27 ft. of water over the top of the completed pipe line, which is jacketed with concrete. Wood piles were then driven with a McKiernan-Terry underwater hammer, cut off and capped to furnish a pair of supporting bents under each

BIG DIAMETER of pipe indicated by men standing within spigot end.

GOING DOWN! Floating derrick *(below)* has picked up 72-ft. jointed pipe section from barge and is lowering it to river bottom during slack tide in river when current velocity is at minimum.

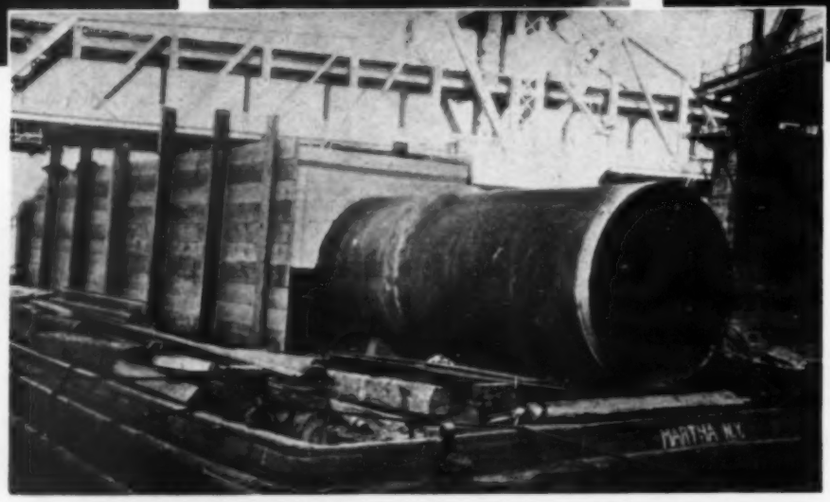


A 78-TON LOAD. Wire rope slings from outriggers on steel-truss strongback pass under each 12-ft. length of pipe in 72-ft. jointed section. Spigot end covered by lead band for underwater calking by divers.

PRECAST BULKHEADS *(above)* of concrete are molded to fit top of pipe.

SIDE FORM PANELS *(above, center)*, are swung into place by derrick barge.

FORMS *(above)* are set 18 in. beyond side of pipe and between pairs of precast bulkheads.



READY FOR CONCRETING *(left)* by tremie method. Concreting is done in sections 48 ft. long.

DRESS REHEARSAL of scheme for jacketing pipe with concrete after it is lowered to place on bed of river.

12-ft. pipe length, just back of each joint. To the caps were spiked cast-iron cradles curved to fit the under sides of the big pipe lengths.

While the underwater pile and cradle support for the line was being built, 12-ft. lengths of 84-in. bell-and-spigot pipe from the Warren Foundry & Pipe Co., each weighing 10 tons, were assembled on barges and jointed with lead poured hot and calked with pneumatic tools to form sections 72 ft. long. Around the spigot end of the last pipe length in each section a lead band was cast to a thickness which would not obstruct the entry of the spigot into the bell of the pipe section in place on the river bottom. With the pipe sections fitted together under water it was comparatively easy for divers to complete the joints between 72-ft. sections by driving home with air calking tools the lead band on the spigot.

After sections of six pipe lengths had been jointed up into units 72 ft. long, on barges, a strongback, in the form of a riveted steel truss, was lowered on to the top of the pipe and lashed to it with the aid of curved wood saddles and wire rope cables passing underneath the pipe and made fast to steel I-beam outriggers, projecting from the bottom chord of the strongback as illustrated on p. 37.

TWISTED WIRE TIES hold side form panels against sides of precast concrete bulkheads.

The 78-ton load of pipe section and strongback was then picked up by the floating derrick and lowered to place on the saddles above the pile bent caps. This operation was always timed to occur at slack tide when the velocity of the river current was at a minimum. Divers directed the junction of successive sections of the huge submarine line and completed the lead joints between the 72-ft. sections.

The final operation consisted in encasing the submerged line in concrete. Precast saddles of concrete, curved to fit over the top of the pipe, were placed at 48-ft. intervals to serve as bulkheads between side form panels built of lumber bolted to I-beam stiffeners. These forms were set 18 in. out from the sides of the pipe and were filled with concrete placed by the tremie method. Over the top of the pipe the concrete jacket was made 2 ft. thick.

For the Empire City Subway Co., H. S. Swain is chief engineer and A. T. Moran resident engineer. For the Merritt-Chapman & Scott Corporation, George Burrows, assistant manager, Construction Department, is engineer in charge and C. B. Christiansen is superintendent.

# *Eliminating Detours With*

# QUICK-SETTING CEMENT

HIGH - EARLY - STRENGTH cement is aiding the North Carolina Highway Department in eliminating detours formerly required in connection with the closure of gaps in concrete paving over fills on culverts and replacement of slab sections washed out by landslides.

The policy of the department is to permit all fills to settle for about a year before laying pavement on them. During the subsequent closure of the paving gaps thus created the detouring of traffic proved to be expensive and particularly undesirable in the mountainous sections of the state where it became necessary either to bridge half of the gap temporarily or to build a run-around through the bed of the stream. These expedients have become unnecessary since the adoption of the practice of using high-early-strength cement for closing the gaps with two-strip construction.

The first half-width strip is poured while traffic is maintained over the other half of the roadway. In 36 hours the traffic is turned over the first half-width strip and the second strip poured to close the gap.

The handling of the details of a job of this sort in the mountainous section of the eighth district of the department is typical of the methods adopted. A bridge maintenance gang of the department is stationed in a camp of portable houses on the project, covering work within 20 miles. This gang has portable equipment. Sand and stone for the concrete are delivered in advance in piles close to each gap. Cement is brought in as required. A one-bag mixer on a four-wheel rubber-tired mounting is set up on the slab at one end of the gap. The mixer is charged and the concrete delivered to place with wheelbarrows.

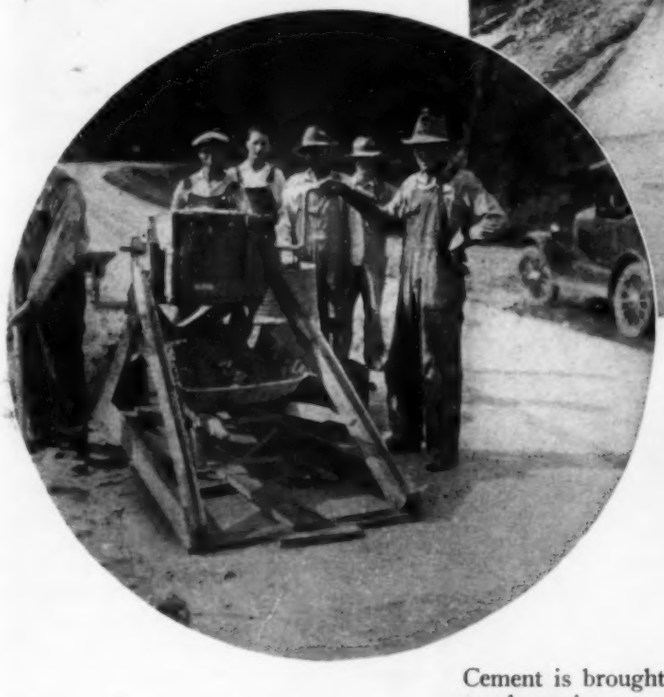
As soon as the first strip is finished, the mixer is shifted to the next gap, and so on until the first strip on all of the gaps is placed. Then the gang returns and closes the second strip, traffic being diverted meantime to the first strip.

For the measurement of water for the concrete an effective homemade inundator has been developed. It consists of a tight metal-lined box mounted on an iron-rod trunnion having a handle bent on one end. This trunnion is set in the box eccentrically so that the handle has to be used to dump the load. About the right amount of water to saturate the sand is first poured into the box. Then the latter is filled with sand and enough water added to complete the saturation.

Before laying the second strip the exposed faces of the previously placed concrete are cleaned with a long-bristle, flexible paint brush. On account of traffic on the first strip this brushing usually has to be done frequently while pouring is under way. Joints are filled with the standard compound used in maintaining cracks in the slab.

John D. Waldrop is state highway engineer of North Carolina, W. L. Craven is bridge engineer and H. E. Noell is engineer of the eighth district.

PLACING SECOND STRIP of The second man is brushing the earth and dust from the surface gap closing in concrete slab of the finished first strip.



HOMEMADE SAND INUNDATOR *(left)* used to insure the correct water-ratio in the concrete.

# DAM, *Precast to Fit River Bed,* DROPPED *Into Place*

TO TURN the Saguenay River temporarily into a diversion canal during the construction of a dam and hydro-electric power station at Chute-a-Caron, 140 miles north of Quebec, the Alcoa Power Company, subsidiary of the Aluminum Company of America, adopted the spectacular method of building a precast bulkhead, standing on end like an obelisk and molded to fit the contour of the river bottom, blasting away part of its support and allowing the huge concrete block to tip over and fall into place across the stream, forming an effective cofferdam wall.

As designed by James W. Rickey, hydraulic engineer of the Aluminum company, the masonry block was 92 ft. high, 45 ft. wide and 45 ft. thick, containing 5,500 cu.yd. of concrete. It was supported by a concrete pier along one edge of which were rows of holes loaded with dynamite. When these charges were fired part of the supporting pier was blown out, allowing the precast dam to tilt over and drop across the river like a falling chimney, the 30-ft. depth of water serving as a cushion to break the impact. The 11,000-ton mass of masonry, when it struck the water, threw spray a distance of 400 ft.

The entire operation had been so nicely calculated that the diversion dam settled accurately into the place provided for it.

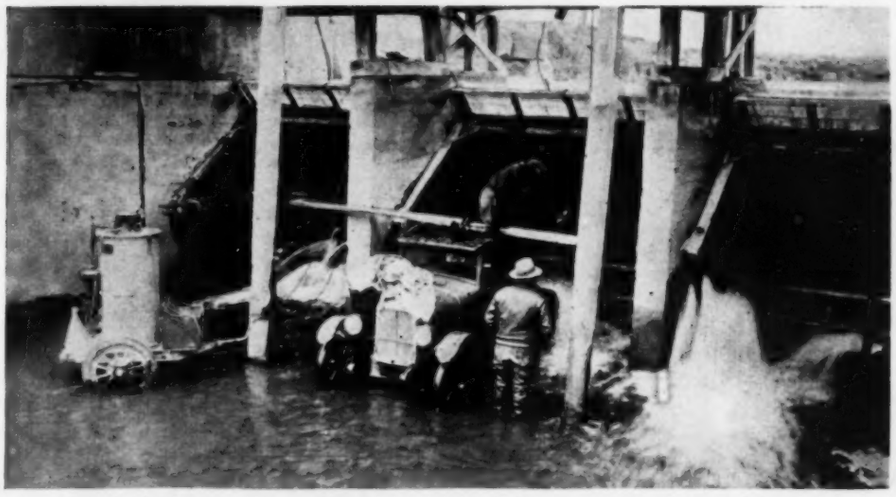
LIKE AN OBELISK *(above)* the diversion dam was built on end, its side molded to fit the contour of the stream bed into which it was to fall.

THE SPLASH *(right)* as the 11,000-ton masonry mass hit the river, threw spray 400 ft.

A NICE FIT. So perfectly had all operations been calculated in advance that the 5,500-cu.yd. block of concrete settled accurately into place, forming a cofferdam wall to protect excavation and masonry work on the power plant site.

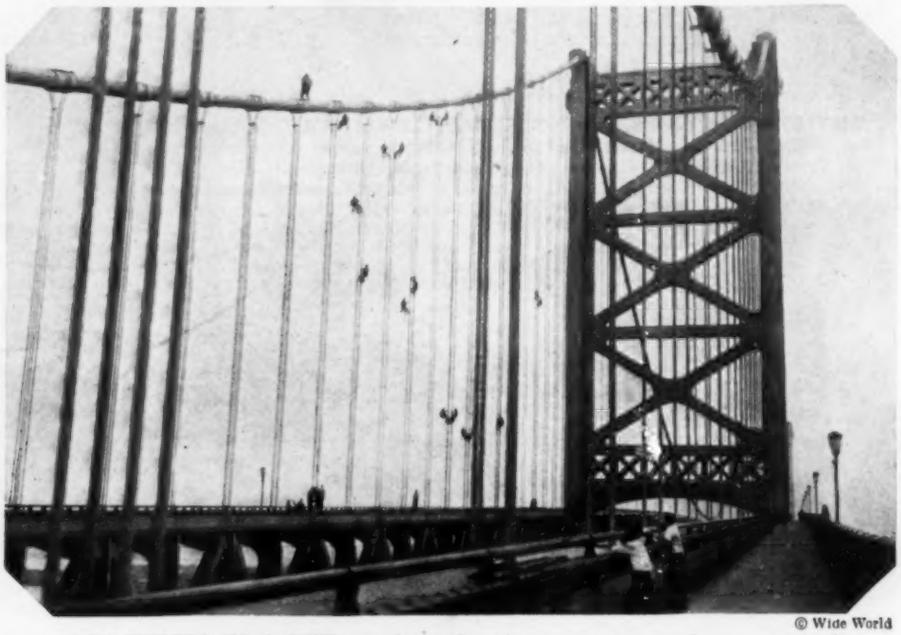
# JOB ODDITIES

**A Monthly Page of Unusual Features of Construction**



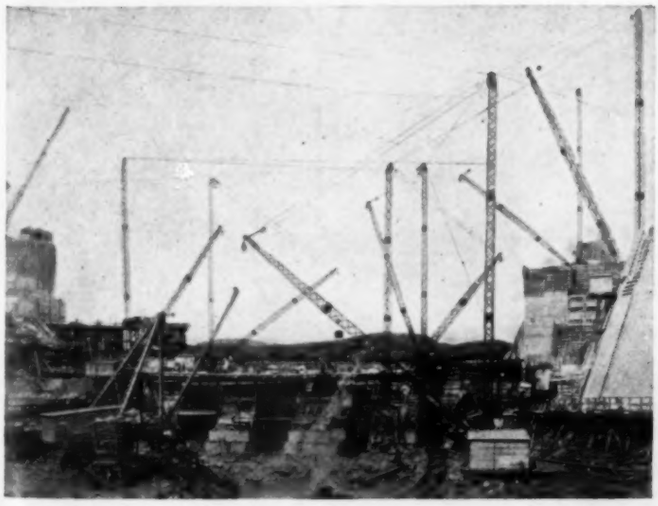
AUTOMOBILE TOP serves as convenient working platform for repairing one of the headgates on the North Side canal of the Twin Falls irrigation project in Idaho.

TAKEN FOR A RIDE. Steel worker on 1,248-ft. Empire State Building, swings above New York's streets, with Chrysler Building as background.

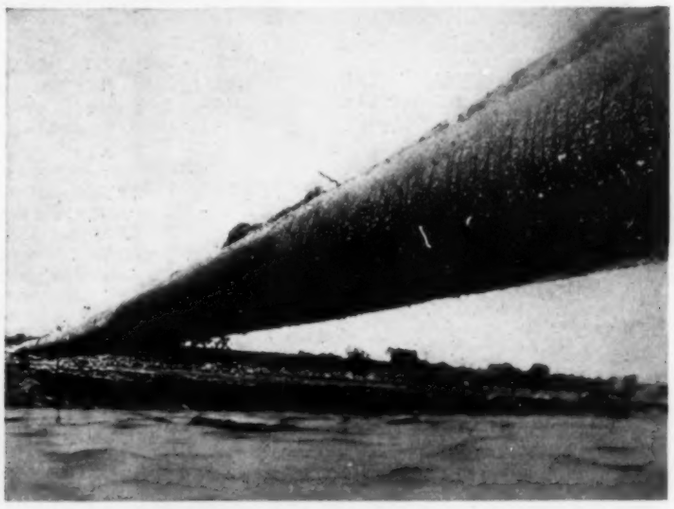


© Wide World

LIKE SPIDERS IN A WEB members of maintenance crew apply new coat of paint to Delaware River suspension bridge between Camden, N. J., and Philadelphia.

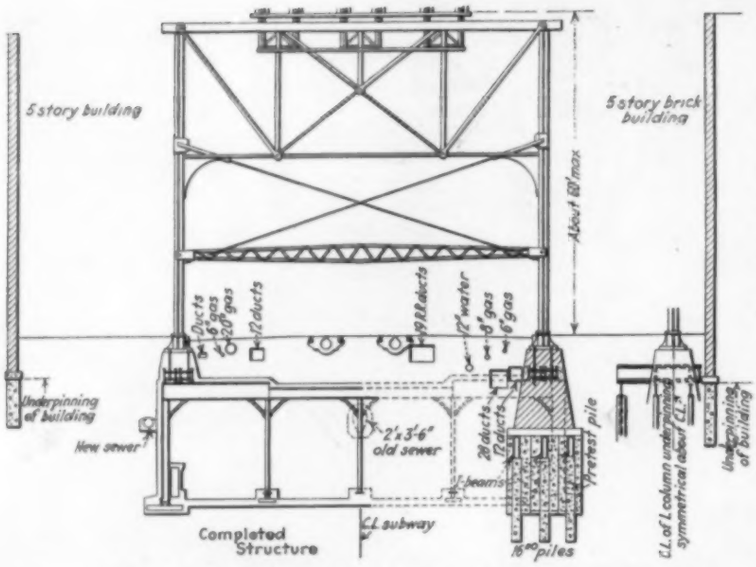


FOREST OF DERRICKS sprouts on construction of Fifteen Mile Falls hydro-electric development on Connecticut River in New Hampshire and Vermont. A total of 11 American steel guy derricks is in service for material handling operations, most of them 15-ton units with 100-ft. booms.



UNSUPPORTED in the style to which it had been accustomed. Washout in San Fernando valley, California, undercut this 12¾-in. acetylene-welded National steel pipe line, which bridged an 80-ft. gap like a tubular bridge.

# *Building New York's Subways—V*




**METHOD OF UNDERPINNING ELEVATED RAILWAY COLUMN** in 1925. Contractors install piles in individual pits and insert permanent needle beams through old pier. Unusual height of elevated structure is due to valley crossing.

UNDERPINNING elevated railway piers presents one of the most serious problems on many sections of New York City's new $650,000,000 subway system. The subways by necessity are often located in through streets which already are occupied by the elevated railways. Economy and ease of construction at the time of their erection dictated that columns of the elevated structures be placed inside the street limits, usually along the curb lines. The brick piers supporting these columns do not extend to subway subgrade, and their broad footings in nearly all cases interfere with erection of subway steel.

The subway contractors are faced with the necessity of underpinning the piers to a safe depth until the column loads can be transferred to the subway roof steel. As a corollary, the underpinning must be designed to permit erection of the subway steel.

In the few years that the present subway program has been under way, contractors have made great progress in simplifying and expediting the operation of underpinning elevated railway columns. Back in 1925, subway builders went through the tedious process of underpinning the piers in sections by sinking box-sheeted pits and jacking down cylinder piles. Needle beams to transfer the column load to the subway roof steel were concreted into the old pier. This method still is the only practicable one in a few places; but in most cases it has been superseded by a much simpler process.

**CYLINDER PILE** is jacked down and wedged up in sheeted pit under corner of pier.

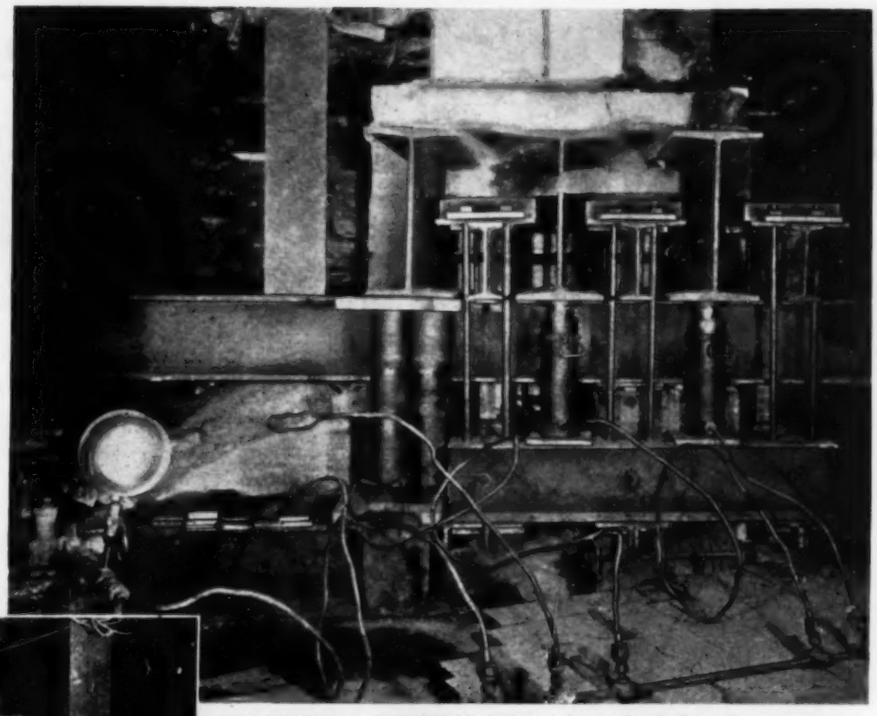
**TO INSTALL PERMANENT GRILLAGE BEAMS,** workmen first cut hole through center of old pier with pneumatic tools.

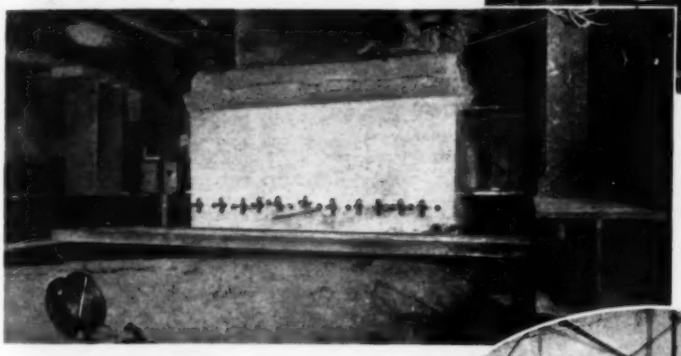
**AFTER CONCRETING PAIR OF PERMANENT BEAMS INTO PIER** *(left)*, workmen open slots along sides of pier to receive additional I-beams.

**NEEDLE BEAMS REST ON SUBWAY ROOF STEEL** *(right)*. Underpinning pier and piles have been removed to allow erection of intermediate steel subway bents. Heyman & Goodman Co., Inc., contractor.

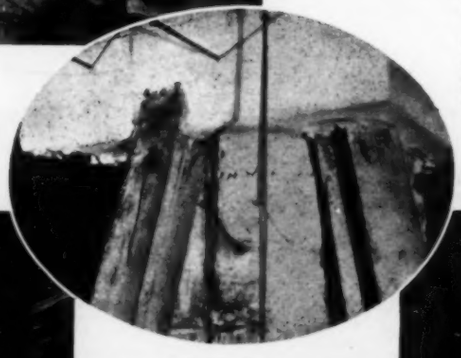
# Needle Girders Simplify Underpinning of Elevated Railway Structures

The new method picks up the column on needle girders placed on the street surface. With the load transferred to these girders, workmen remove the old pier and sink a pit to desired depth below subgrade. An underpinning pier containing the permanent grillage beams is constructed in the pit. Where a concrete pier would interfere with steel erection, the builders often use a steel tower. In water-bearing earth, they sometimes drive cylinder piles and install tower bracing as subway excavation proceeds.

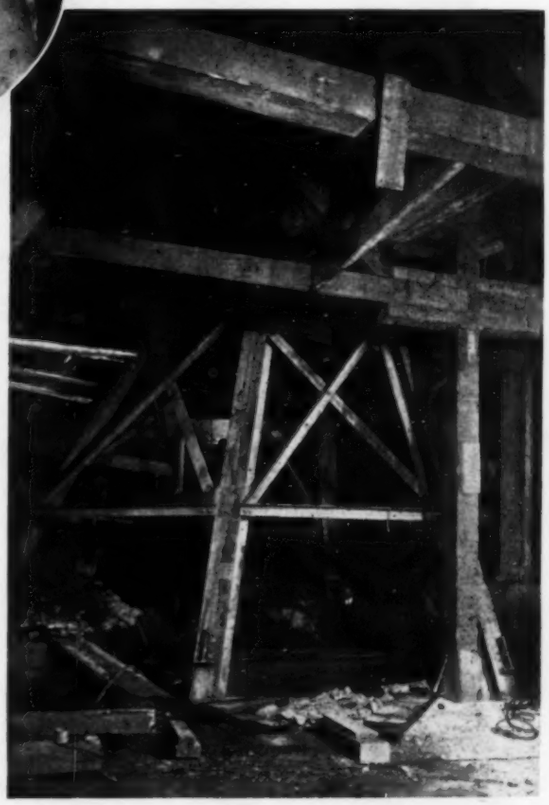




FRACTURING EXISTING PIER *(above)* by jacking it apart preparatory to transferring load to two long H-beams, one on each side of pier. Three I-beam needles have been installed in pier, one at a time. Jacks under two of these needle beams rest on short steel beam suspended from H-beam by three hangers. Manifold connection from hand pump serves number of hydraulic jacks. Marcus Contracting Co., Inc., contractor; Spencer, White & Prentis, Inc., works manager. LINE OF DRILLED HOLES *(left)*, determines plane of fracture in existing pier. After hydraulic jacks have caused fracture by raising upper portion of pier, shims are placed between needle beams and H-beams to transmit load to H-beams, and jacks are released. H-beams support pier and column until subway structure beneath them is completed.

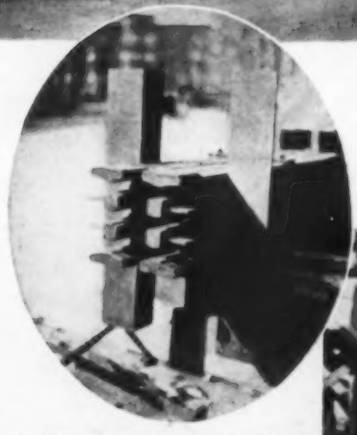


SIX BATTERED H-SECTION POSTS *(left)*, support elevated railway column. Existing pier, 45 ft. deep, extends to subway subgrade. Posts rest on steel bases on concrete footings. To fracture existing pier, two hydraulic jacks are placed under jacking brackets at bottom of each post. TOPS OF H-SECTION POSTS *(in oval, above)*, are set into niches cut in pier and are cast in reinforced concrete cap. Pier splits along line of drilled holes when pressure is applied to jacks. Steel posts are wedged up to release jacks. WITH PIER REMOVED *(right)*, tower composed of six 14-in. 96-lb. Carnegie H-sections supports column and permits placing of steel grillage beams. Marcus Contracting Co., Inc., contractor; Spencer, White & Prentis, Inc., works manager.

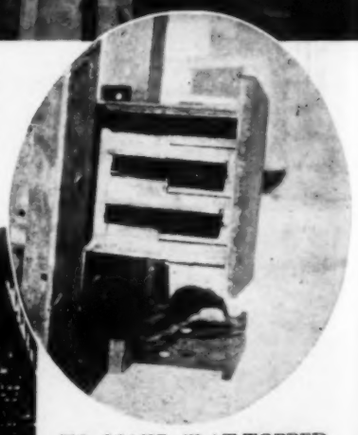


# *Building New York's Subways—Part V (continued)*

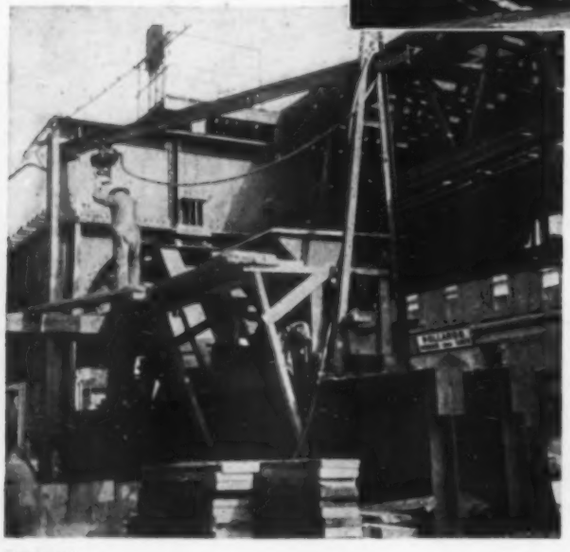
NEEDLE GIRDERS ON SIDEWALK support column and allow full freedom in removing existing pier and building underpinning pier. Special steel jacket is required to lift Phoenix cast-iron column. Air hoist on trolley beam handles spoil buckets. Carleton Co., Inc., contractor. PHOENIX COLUMN *(above right)*, made up of six segments, with bracketed cap, requires special blocking to lift it.



FORM-FITTING STEEL JACKING BLOCK is slotted to engage with bracketed cap of Phoenix column.

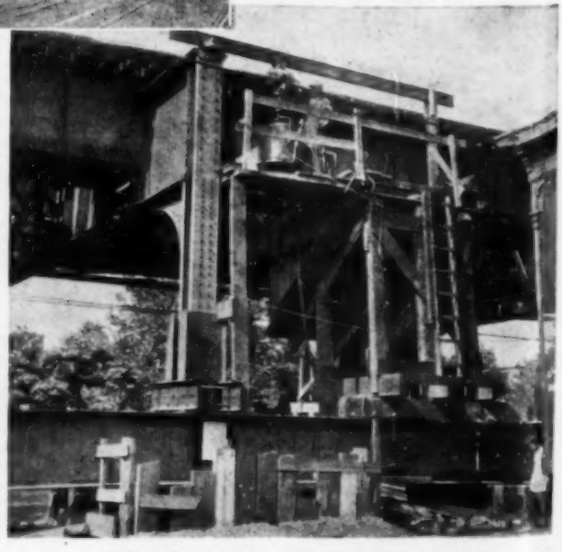


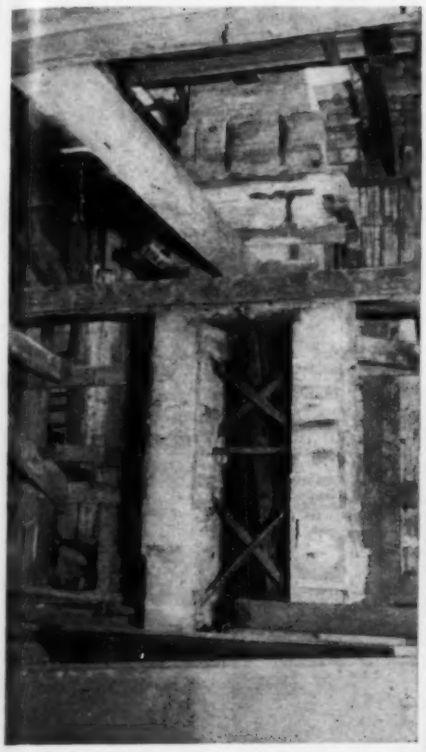
TO MAKE FLAT-TOPPED COLUMN, for use under bents of more modern design, Carleton Co., Inc., fills in slots and welds cap to post.



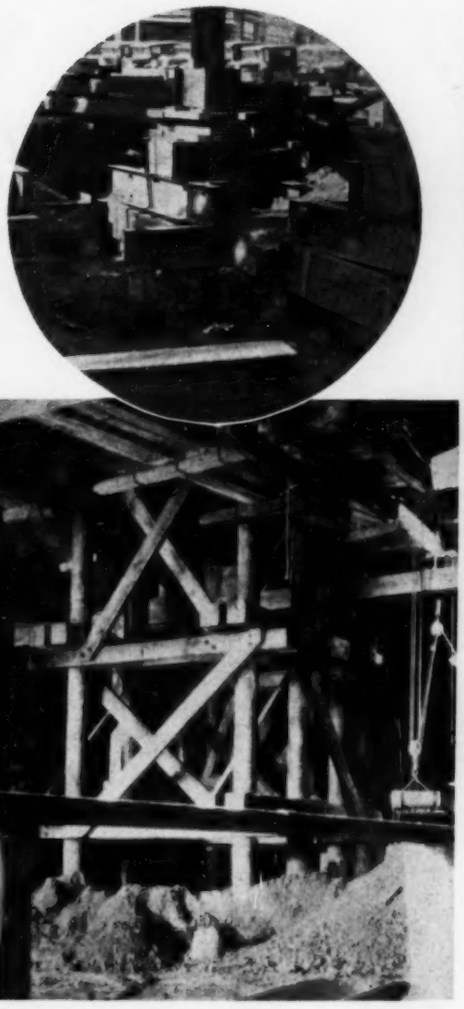
BY RIVETING BRACKETS TO COLUMN *(right)* and placing girders on sidewalk, Goldberger-Raabin Co., Inc., leaves street clear and underpins alternate columns *(above)* simultaneously.

TO RAISE COLUMN OF MODERN STRUCTURAL BENT *(left)*, Carleton Co., Inc., places needle girders in street and jacks up transverse girder. As needle girders impede traffic, simultaneous set-ups are widely separated.

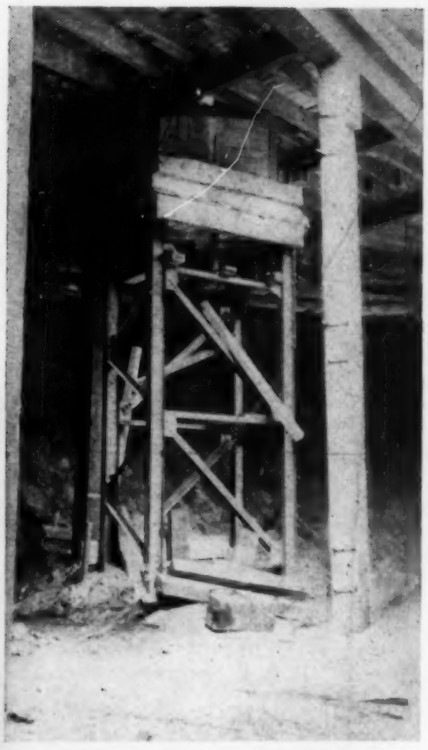




TO FACILITATE DEMOLITION, underpinning pier is built with two shafts laced by steel angles. In wrecking pier, shafts are jacked apart or are pulled out by cable leading to power drum. Just below permanent grillage, set to correct line and grade, are cleavage planes formed by wood or sheet metal. Portion of concrete separated by cleavage plane is knocked out to allow erection of subway roof beam.

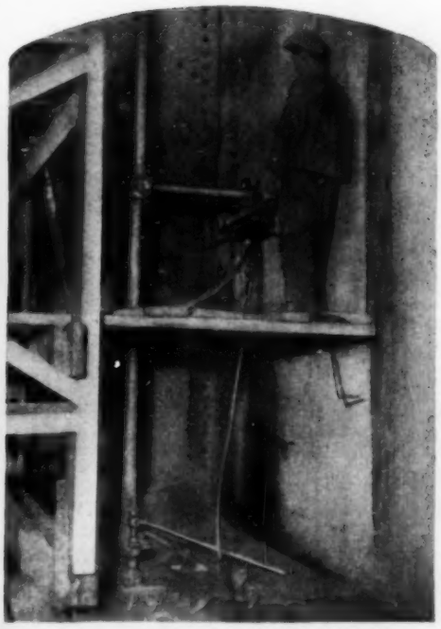


CYLINDER PILES *(in two photographs above)*, driven outside footings, support columns which have to be concreted monolithically with subway roof. Triest Contracting Corporation installs tower bracing as excavation proceeds.



WHERE CONCRETE UNDERPINNING PIER CANNOT BE USED, because of interference with steel erection, Carleton Co., Inc., erects steel tower with four columns, each built up of two channels. Permanent subway grillage rests on tower until roof steel is placed.

CONCRETE PIER ON NEAT LINE OF SUBWAY STRUCTURE. Column load will rest partly on subway roof and partly on portion of pier left standing. Triest Contracting Corporation cannot use vertical cleavage plane in piers of this type. Horizontal cleavage plane under grillage beams, to assure clean break, is permitted.

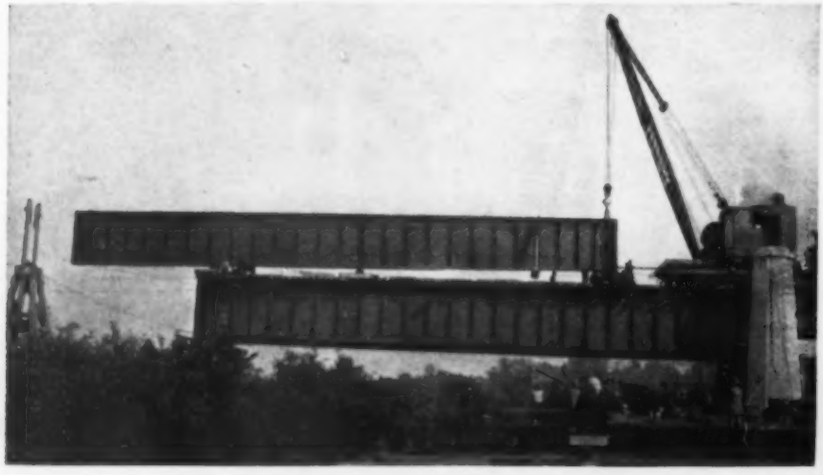


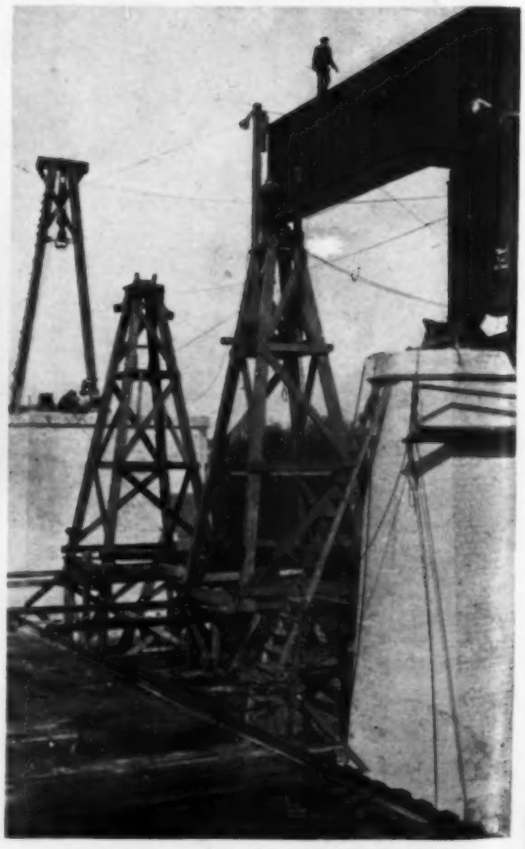
DRILL MOUNTED ON COLUMN cuts holes to break off portion of pier inside subway structure. PORTION OF PIER UNDER GRILLAGE BEAMS, *(left)* is removed by drilling line holes and using plugs and feathers.

# *Getting Down to* DETAILS

SECURELY BLOCKED for shipment. How a Northwest power shovel, loaded on a railway flat car, is protected from damage in transit. Crate under boom, fastened to car floor, contains extra parts. Engine is protected from cinders and dust by heavy manila paper covering.

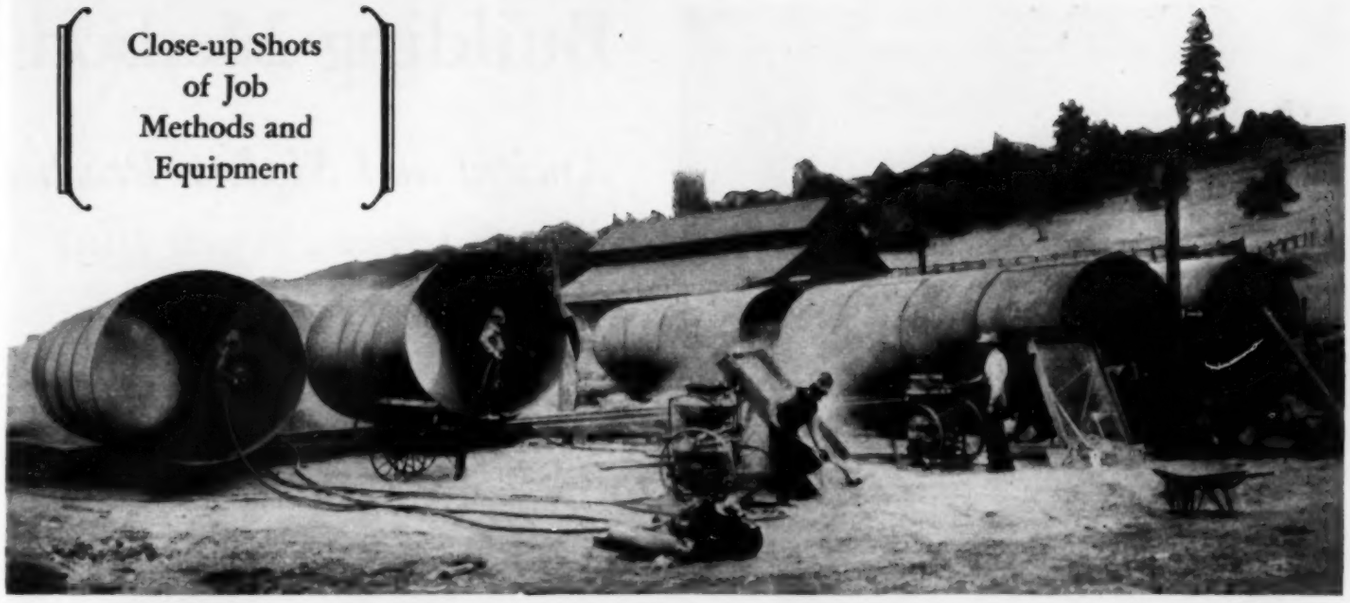
THIN GUNITE LINING *(right)* is applied to 350,000 sq.ft. of Moffat tunnel, Colorado, to prevent rock falls. Work cars carry plant and scaffolding for scaling and shooting. Inspector, at left, tests thickness of coating.



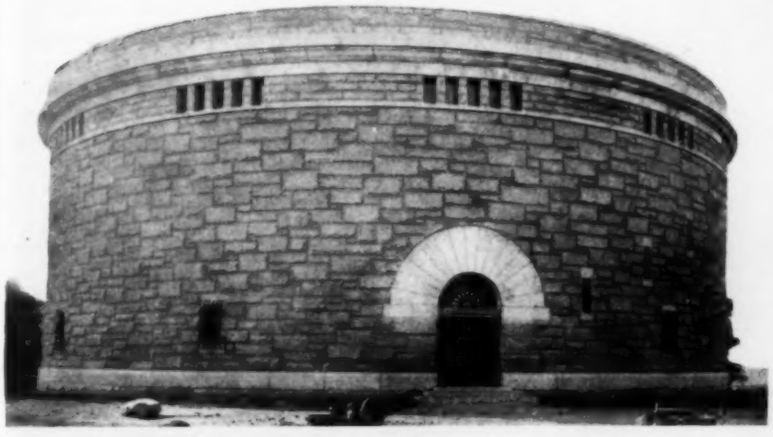


GALLOWS FRAME AND TEMPORARY TOWERS facilitate launching of 107-ft., 74-ton plate girders for Grand Trunk Western Railway's six-span bridge across St. Joseph River, Indiana. Supported on two car trucks *(above)* girder is pushed out by 50-ton crane until its end rests on greased rollers on timber tower *(right)* at one-third span. Vertical guide rollers hold girder in line. Cable from gallows frame on pier holds end of girder during remainder of its travel. On channel spans, forward end of each girder is outhauled and supported by tackle from gallows frame on pier. The contractors for the bridge are Foley Bros., and Fulton & Peppard, of St. Paul, Minn. For the railway, W. G. Heggie superintended field operations.

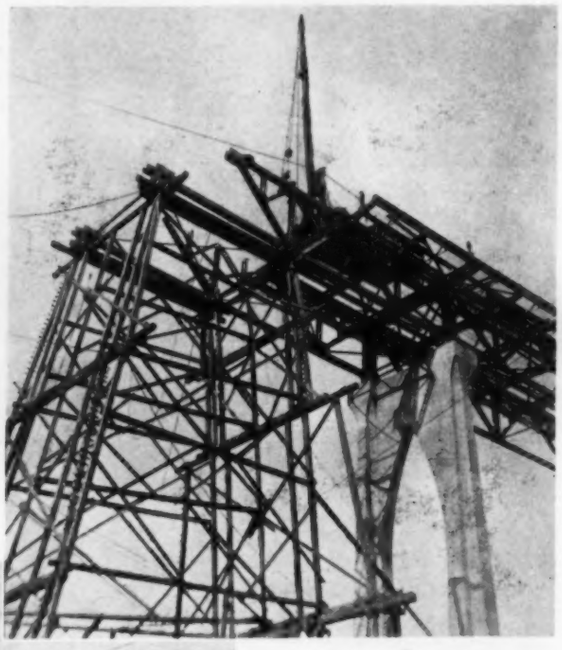
## Close-up Shots of Job Methods and Equipment



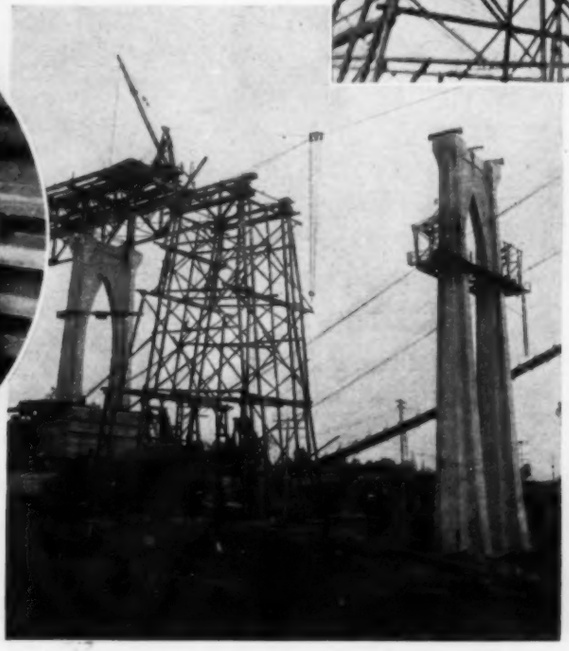
SAND BLASTING removes factory paint from interior of penstock pipe after delivery in field for Pacific Gas & Electric Co., of California. Before assembly in penstock line pipe interiors receive special protective coating.



GRANITE wall construction of split-face gray ashlar, laid in interrupted courses, produces architectural effect at water tower in Roslindale, Mass.



TO TEST WELDS, without destroying them, this magnetic device has been developed by the Westinghouse research laboratories. Welded seam is bridged with horse-shoe electro-magnet and magnet field in vicinity of weld "explored" with meter.



HIGH TIMBER FALSEWORK carrying derricks is a feature of the erection procedure followed by the American Bridge Co. in placing steel for the approaches of the St. Johns suspension bridge over the Willamette River at Portland, Ore.

If your work has developed interesting construction details, the Editor of *Construction Methods* wants photographs of them.

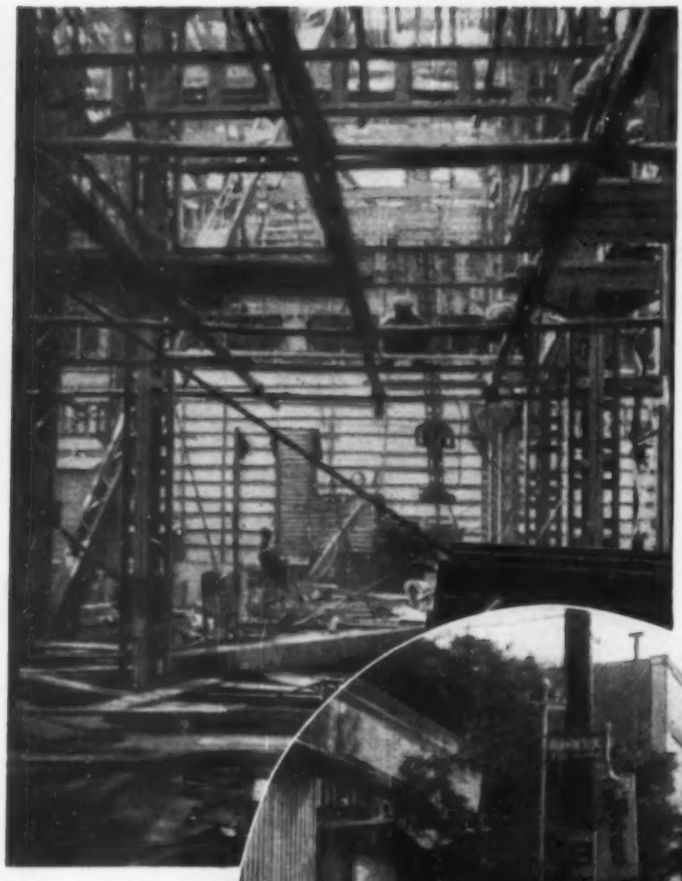
# Building Methods

## *Ancient and Modern Practice on Current Projects Illustrates Striking Contrasts*

ANCIENT and modern methods of building are today found side by side in Japan. The accompanying illustrations and notes from Fred H. Colvin, representative of the McGraw-Hill Publishing Co. during the recent International Engineering Congress in Tokyo, indicate a few details of current construction practice in the Orient.

The Japanese carpenter is an excellent wood worker and the joints he makes with his pull-saw, pull-plane and stubby mortising chisel should be the envy of many carpenters in other lands.

The Japanese method of building reinforced concrete structures is to erect a steel framework for the entire building that closely resembles a complete steel structure, except that the steel is considerably lighter in weight and section. Wood forms for the concrete are then erected around the steel structure and the concrete poured, beginning with the lower stories. Similar methods are used in other structures, such as those for elevated railways.



**BAMBOO** and other light woods are largely used for scaffolding in Japanese building construction.

**HAULAGE** *(above)* of sand for concrete is done by man power. Cart wheels run on metal traffic plates.

**CARPENTER** is finishing joint with pull-plane. Pile of shavings in foreground indicate his activity.

**BENDING** *(right)* of steel reinforcing rods for concrete buildings is done on the job by simple hand-operated device, requiring many hours of labor for large structure.

# in Japan

SHALLOW BASKETS, hung from poles carried by laborers, remove earth from foundation excavation. Across the street a modern steam shovel is at work.

STEEL SKELETON *(above)* is completely erected for reinforced concrete building before wood forms are set and poured.

MODERN CONCRETE CONSTRUCTION is exemplified by new elevated railway line in Kobe.

JAPANESE FOREMAN *(below)* studies blueprint plans for erection of new concrete building in the suburbs of Tokyo.

The age-old, back-breaking method of carrying earth from an excavation for a foundation by man power in small shallow baskets was found just across the street from a steam shovel doing similar work. Sand for use in mixing concrete was hauled by hand.

Bamboo and other light woods are used very largely for scaffolding work. Reinforcing rods for special uses, such as floor slabs in building, are bent to the desired shape by hand.

Thirteenth of a series of articles on the $325,000,000 construction program for flood control in the Mississippi Valley

# The Defense Against OLD MAN RIVER-XIII

By ROBERT K. TOMLIN
Editor of *Construction Methods*

## Improved Tower Excavator and Clamshell Dredge

**This is the thirteenth and concluding article in the series on "The Defense Against Old Man River" which began in the December, 1929, issue of *Construction Methods*. The object of the series has been to present to engineers and contractors a comprehensive picture of the varied methods and equipment used on the Government's $325,000,000 program of levee building and bank revetment on the Mississippi River.**

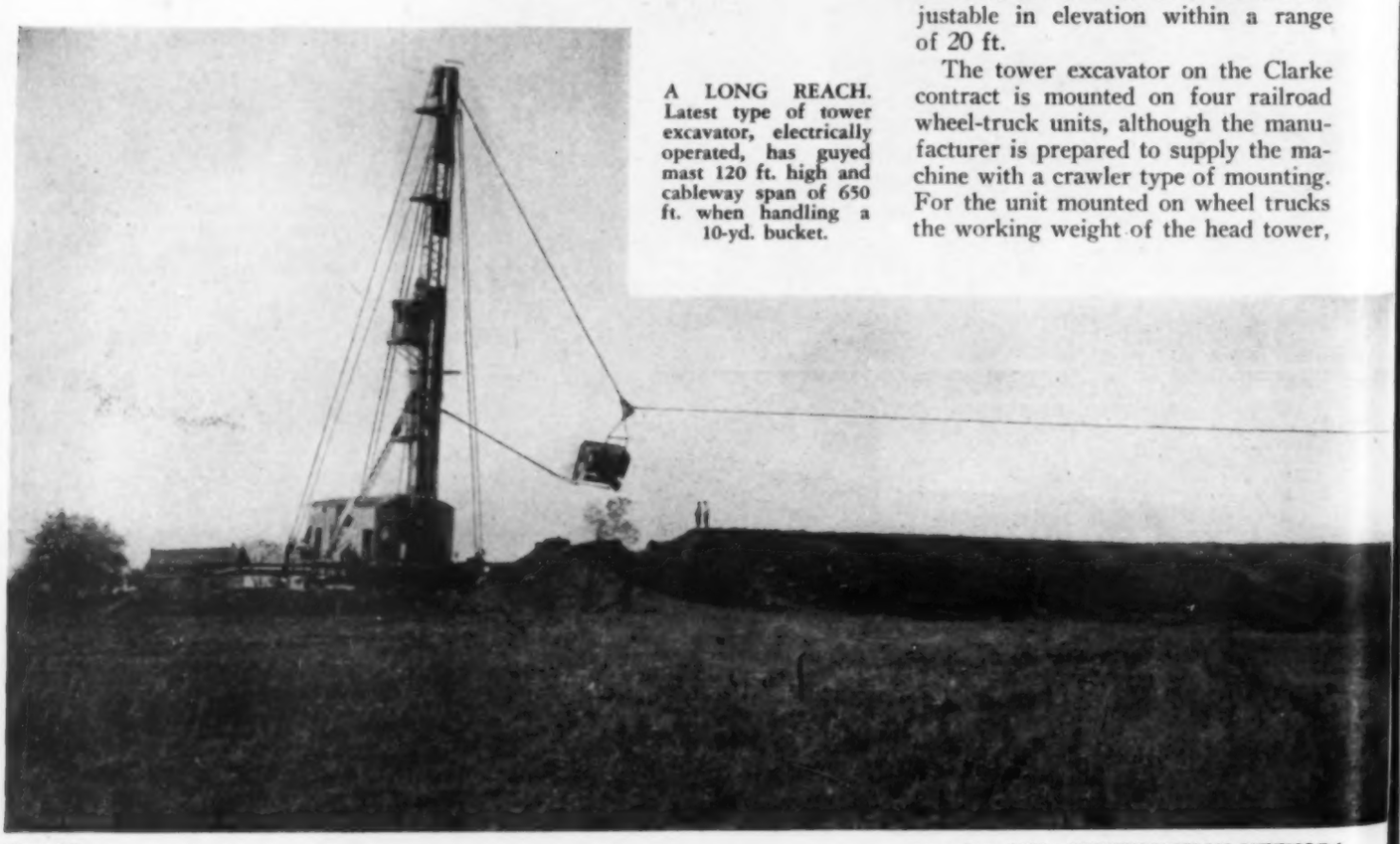
RADICAL changes in the design of the huge tower-cableway excavators used for Mississippi River levee building have been made since the first article in this series appeared in *Construction Methods* for December, 1929. On its contract for placing 2,056,000 cu.yd. of earth in levees for the Birds Point-New Madrid floodway, in Missouri, southwest of the junction of the Ohio and the Mississippi rivers at Cairo, Ill., Clarke Bros. Construction Co., of Clinton, Iowa, has been operating one of the new machines and obtaining with it remarkably high monthly yardages, a record-breaking total of 231,000 cu.yd. having been placed during October.

*Mast 120 Ft. High*—Designed and built by the Bucyrus-Erie Co. of South Milwaukee, Wis., the head tower of the new machine is equipped with a structural steel mast 120 ft. high, guyed by wire rope cables to the rear and sides of the frame, and reinforced by a pair of inclined stiff-legs which serve also as an A-frame for the erection of the mast in the field. The mast is pin-connected to the front end girder of the frame of the machine. The bucket handled by the cableway has a capacity of 10 cu.yd.

The new 120-ft. mast tower is about 20 ft. taller than the steel frames of the older machines, some of which last year were raised from about 70 ft. to 100 ft. above the ground. The new unit is driven electrically, instead of by steam. Electric power is supplied by a transmission line served by an electric generating plant built by the contractor and equipped with two 400-hp. Diesel engines.

The working principle of the new tower excavator is the same as the old, involving independently operated head and tail towers supporting a $1\frac{3}{8}$-in. diameter cable track of at least 650 ft. span across the borrow pit. The 10-yd. bucket on the new machine is hauled in by a $1\frac{3}{8}$-in. diameter drag cable, with provision for a $\frac{3}{4}$-in. backhaul cable where conditions prevent gravity return of the bucket to the pit. The sheaves for the track and drag cables are each 54 in. in diameter and are adjustable in elevation within a range of 20 ft.

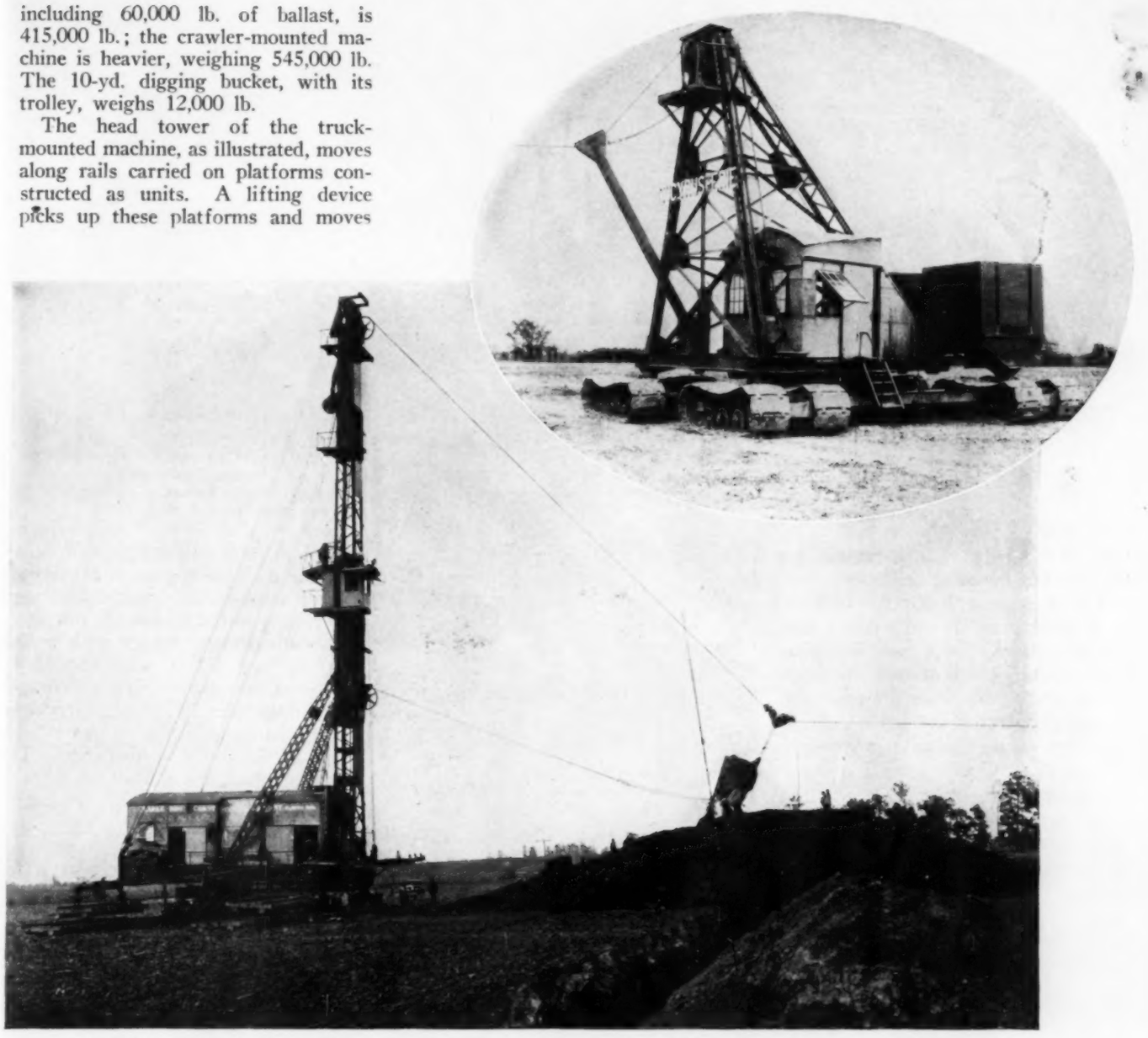
The tower excavator on the Clarke contract is mounted on four railroad wheel-truck units, although the manufacturer is prepared to supply the machine with a crawler type of mounting. For the unit mounted on wheel trucks the working weight of the head tower,



**A LONG REACH. Latest type of tower excavator, electrically operated, has guyed mast 120 ft. high and cableway span of 650 ft. when handling a 10-yd. bucket.**

including 60,000 lb. of ballast, is 415,000 lb.; the crawler-mounted machine is heavier, weighing 545,000 lb. The 10-yd. digging bucket, with its trolley, weighs 12,000 lb.

The head tower of the truck-mounted machine, as illustrated, moves along rails carried on platforms constructed as units. A lifting device picks up these platforms and moves



RAILROAD TRUCK MOUNTING is used on head tower of Clarke machine, although crawler mounting can be had. Inclined stiff-legs aid in erection of mast and help in bracing it after it is in position. TAIL TOWER *(in oval)* moves on crawlers and is 30 ft. high. It contains drum for storing track cable and is gasoline-powered.

PUMPING PLANT *(above)* on barge lifts water from river to borrow pit to float the big dredge.

BRACED BOOM *(left)* of California type dredge, handling 6-yd. bucket, has reach of 240 ft.

them ahead to provide a runway for the travel of the machine.

The tail tower, 30 ft. high, is mounted on crawlers and is powered by a four-cylinder, 80-hp. gasoline engine. It is equipped with a drum for the storage of track cable when the tower excavator is operating at less than normal cableway span. The tail tower weighs 181,000 lb.

*Clamshell Dredge* — Another example of extremely heavy plant is found on a contract at Valewood, Miss., where the Orleans Dredging Co., this year, introduced a type of heavy floating equipment new on Mississippi River levee-buildng work, but used previously in California. It comprises a steam-operated dredge with a hull 150 ft. long, 70 ft. wide and 12 ft. deep, on which is rigged a boom of exceptional length, 240 ft., carrying a 6-yd. clamshell bucket of special design, as illustrated on this page. The dredge, which has a draft of 6 ft., is anchored by spuds 36x36 in. in section and 75 ft. long.

Through a cut in the river bank the dredge is moved in to the borrow pit

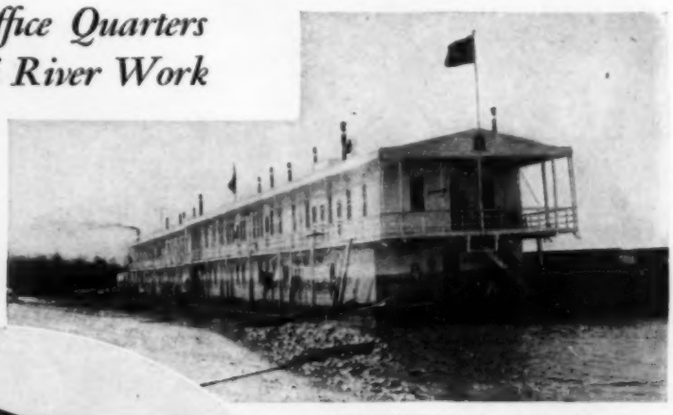
CALIFORNIA TYPE OF DREDGE, floating in borrow pit on Orleans Dredging Company's contract, delivers material direct to levee by means of special 6-yd. clamshell bucket on 240-ft. boom. Hull is 150x70 ft. Draft is 6 ft. Dredge is anchored by 36x36-in. timber spuds, 75 ft. long.

**DIFFICULT DIGGING.** One of the dipper dredges of the McWilliams Dredging Co. ploughing through swamp on line of guide levees leading from Bonnet Carré spillway above New Orleans.

during a high stage of the river and is kept afloat by pumping river water to the pit by a floating plant. The dredge was designed by the Golden State Miners' Iron Works, of San Francisco.

*Quarters*—In concluding this series of articles on construction for Mississippi River flood control, there are illustrated on this page typical examples of the great variety of field and office quarters in which the levee builders are housed.

## *Field and Office Quarters on Mississippi River Work*



**HEADQUARTERS OFFICE** *(above)* of New Orleans river district. **PORTABLE CAMP** *(right)* in Arkansas of Sternberg Co., Inc., contractor, of St. Louis, Mo.

**QUARTERBOAT** *(above)* on which are housed Government engineering and construction forces for revetment and bank paving.

**CAMP** *(above)* in Louisiana for negro workers on framed willow mattress revetment. **RAILROAD CAR** *(right)* houses members of Ward-Hayes Construction Co., near Cairo, Ill.

**A MODEL** *(above)* among U. S. Engineer Department levee-building camps, in charge of Superintendent G. A. Langhofer, near Dumas, Ark.

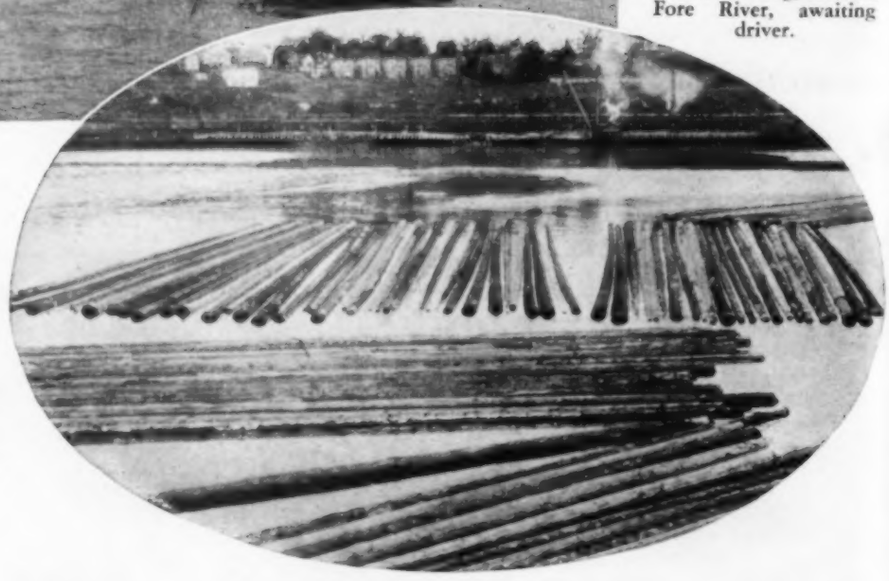
# *Contractor Drives*

# 110-FT. PILES

## *for Portland (Me.) Wharf*

PILE PUNCH, hung alongside leads, has broken hole through layer of hard material on river bottom. Long fir pile is being pulled down into this hole.

TWO DERRICK LIGHTERS of 50- to 75-ton lifting capacity pull total of 4,700 old piles.



FIR PILES (below) from Pacific Coast, 100 to 110 ft. long, float in Fore River, awaiting driver.

GREAT depth and low resistance value of the soft bottom under the Fore River at Portland, Me., made it necessary for the Merritt-Chapman & Scott Corporation to drive 1,800 fir piles 100 to 110 ft. long in constructing a coal-unloading wharf for the Portland Terminal Co., a subsidiary of the Maine Central Railroad. This wharf is part of the Terminal Co.'s $2,000,000 harbor improvement program, which includes two other wharves. One of these, across the river from the coal wharf, will require 2,500 fir piles more than 100 ft. long. The third wharf, on better bottom, has a foundation of shorter pine piles 50 to 74 ft. in length.

As the coal-unloading wharf carries two traveling steam gantry cranes 129 ft. high, it was important that its supporting piles have good load capacity. By using piles 100 to 110 ft. long, the Terminal Co. penetrated 10 ft. or more into solid material below the soft bottom. The formation at the pier site consisted of a hard top crust, a deep layer of soft material, and a solid bottom about 80 ft. below low water.

*Driving Methods*—To drive these very long piles, the Merritt-Chapman & Scott Corporation had two floating steel drivers with 76-ft. leads. Whenever practicable, the driving crew pulled the piles down into the leads with a $\frac{3}{4}$-in. wire rope reeved through a block at the base of the leads.

TRAVELING GANTRY CRANES 129 ft. high, for unloading coal, are erected by steel guy derrick with 130-ft. boom.

The piles usually were penetrating at the rate of about ½ in. per blow under the Vulcan No. 1 steam hammers when driving ceased.

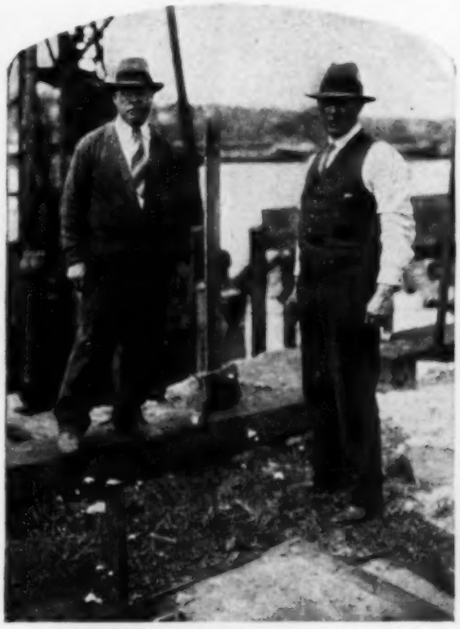
Much preliminary work preceded the actual construction of the first two wharves. Dismantling of an old bridge across the Fore River required the removal of 250 tons of structural steel and the blasting of the draw-span pier. Two derrick lighters pulled 4,700 piles at the sites of the wharves. Of these, 4,000 were the blackened stubs remaining after a disastrous fire of September, 1929, destroyed the old wharf at the site having the better bottom. The derrick lighters, which have a lifting capacity of 50 to 75 tons, used twelve-part lines on six-sheave blocks in pulling the piles. While pile pulling was in progress, a wood land driver with 60-ft. leads and a Vulcan No. 1 hammer drove the shore piles of the wharf

WHARF CONSTRUCTION. Long piles have been pulled into line and capped. Timbers are being laid for gantry runway.

TIMBERS IN PLACE to carry railway tracks and floor of steel shed.

In places where the top crust was too hard to permit this practice, a hole first was punched in the top layer with a shorter pile, and the long pile was pulled down into this hole. Jetting was impossible in the blue clay material.

T. C. BRANNAN, erecting foreman, Blaw-Knox Co.



WILLIAM J. HEPWORTH *(left)*, superintendent, Merritt-Chapman & Scott Corporation, and J. B. TRUMBULL, resident engineer, Portland Terminal Co.

J. A. WHITMIRE, erecting foreman, Blaw-Knox Co.

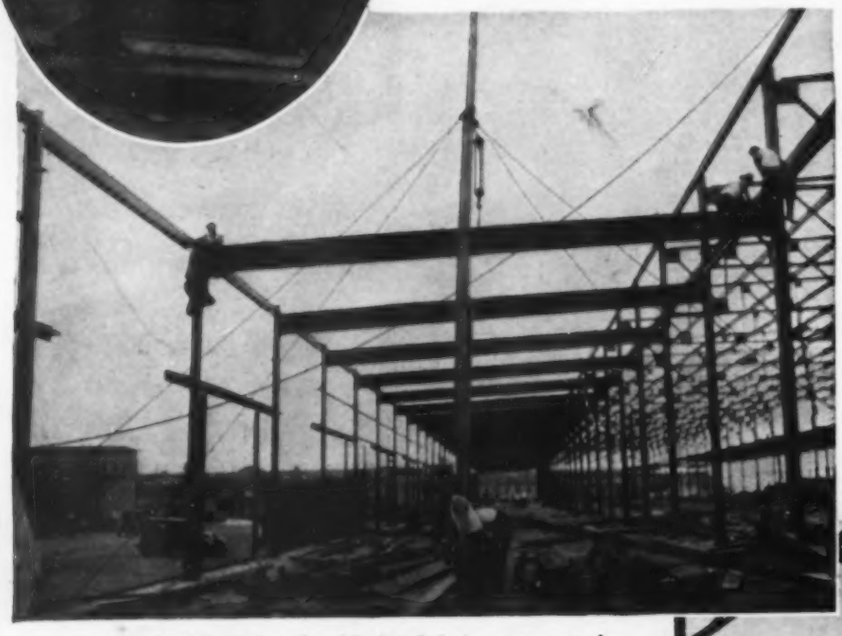
being rebuilt. The two floating drivers completed the driving of the 2,400 piles in this wharf, which is approximately 1,150x160 ft. in size.

*Steel Shed Erection*—On the wharf, a Blaw-Knox standard steel shed, 800x125 ft. in plan, was constructed. The crew of the Blaw-Knox Co. erected the columns, the 60-ft. trusses of the center bay, and the roof rafters of the 32-ft. side bays with a gin pole and a Sasgen hand hoist. In erecting the rafters, weighing 1,800 lb. each, six men and a foreman placed 34 every 9 hours. The shed has been equipped with the most modern mechanical equipment for handling package freight between ship and shed and between shed and car.

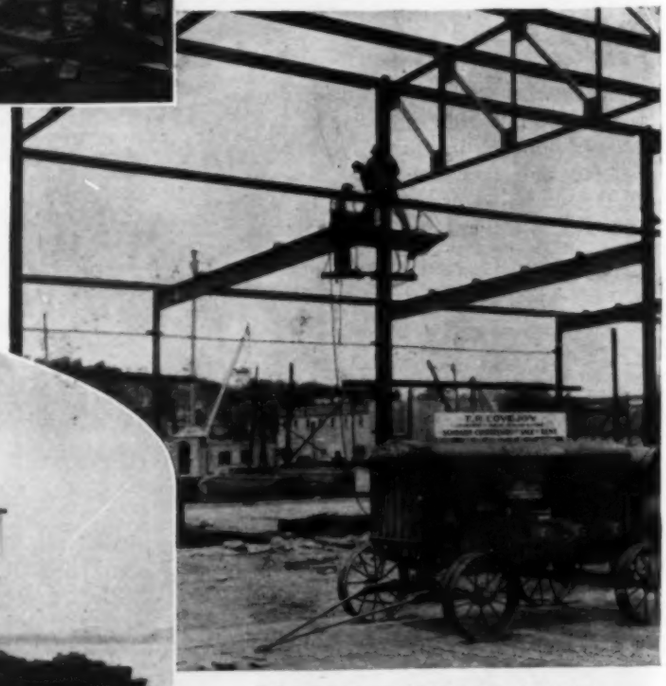
The main coal-unloading wharf has an area 610x80 ft. To erect the two 129-ft. traveling gantry cranes on this wharf, the Mead-Morrison Manufacturing Co., which furnished the cranes, used a steel guy derrick with a 130-ft. boom. Each of the two cranes has a maximum coal-handling capacity of 600 tons an hour. The average operating rate is about 250 tons an hour.

The J. S. Packard Dredging Co., of Providence, R. I., excavated about 350,000 yd. of material at the two wharves with a steam dipper dredge of 5-yd. capacity.

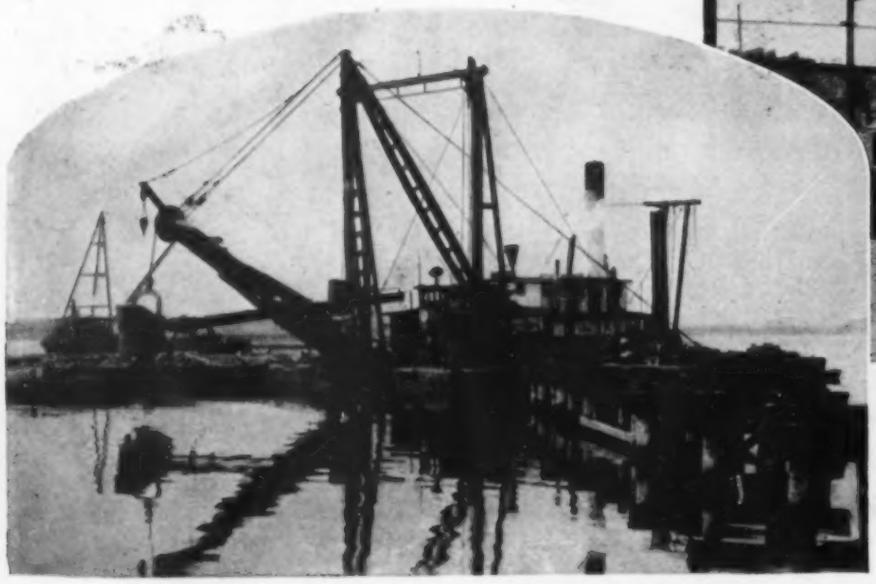
*Supervision*—Asa H. Morrill, chief engineer, Maine Central Railroad, is in general charge of the work. Acting under him is J. B. Trumbull, resident engineer. Fay, Spofford & Thorndike, of Boston, are the consulting engineers. William J. Hepworth, superintendent, directs operations for the Merritt-Chapman & Scott Corporation. In charge of erection of the steel shed for the Blaw-Knox Co. were J. A. Whitmire and T. C. Brannan.



GIN POLE equipped with hand hoist erects roof rafters in side bay of shed. HAND HOIST *(in oval)* attached to gin pole.



RIVETING FRAME of steel shed. Portable compressor supplies air.

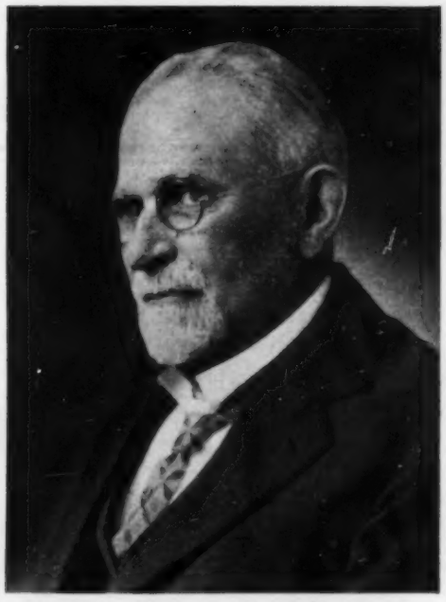


DIPPER DREDGE excavates 350,000 yd. in deepening berths alongside two wharves.

# Present and Accounted For —

## A Page of Personalities

RAILROAD CONSTRUCTORS start Western Pacific's 200-mile extension from Keddie, Calif., to Klamath Falls, Ore. President H. M. Adams at shovel controls, and *(left to right)* H. V. Johnson, resident engineer, T. L. Phillips, principal assistant engineer, R. A. Hollenbeck, construction engineer, Col. J. W. Williams, chief engineer and Bode K. Smith, H. K. Faye, D. C. de Graff, Charles Elsey and T. P. Brown of Western Pacific staff. Contractors, W. A. Bechtel Co.; Utah Construction Co.



REAPPOINTED CITY ENGINEER. R. H. Thomson, 74-year-old veteran in municipal and consulting service, is new head of Seattle (Wash.) engineering department, a position he held under many previous administrations from 1892 to 1911.

FOR 43 YEARS OF SERVICE with the city of Newark, N. J., Edward S. Rankin *(right)*, engineer of sewers, has received Greeley medal from American Society of Municipal Engineers.

HEADS MUNICIPAL ENGINEERS. John W. Reid, consulting engineer to the Department of Public Works, Detroit, Mich., was elected president of the American Society of Municipal Engineers at its annual meeting.

PIGMY GOLF affords noon-time diversion to partners of Youdall Construction Co. on 17-ft. diameter pressure tunnel contract for Cushman project No. 2 for city of Tacoma, Wash. *(Left to right)* L. F. Youdall, R. G. Clifford and Roy C. Hackley. Note nail keg from job used as hazard on course built alongside construction camp.

# NEW EQUIPMENT ON THE JOB

### Self-Priming Pump

A self-priming centrifugal pump with a total head and lift of 50 ft., especially valuable in dewatering excavations, is being marketed by the

Humphryes Manufacturing Co., Mansfield, Ohio. This pump is the open impeller type and is equipped with a large-size vacuum pump which makes the unit capable of speedy priming and higher suction lifts. It is powered by a Le Roi 15-hp., 4-cylinder engine. Its capacity is 425 to 600 gal. per minute. The diameter of the suction is 5 in. and of the discharge 4 in.

### Simplified Control for Scarifier

The substitution of a rugged worm gear and wheel for the usual operating levers is a distinctive feature of the new Trojan "grade-ripper" which is offered to contractors by the Contractors Machinery Corporation, of

Batavia, N. Y. This change, the manufacturer claims, not only makes one-man operation easier, but also permits the scarifying depth to be controlled while the machine is in motion. A definite depth may be maintained without stopping the tractor to make necessary adjustments, as is the case with the lever-operated machine. Equipment includes a universal hitch, or drawbar attachment, which permits the machine to be operated either directly from the tractor or by a chain hitch.

The grade-ripper is provided with a full complement of seven special-shaped teeth suitable for the type of work to be performed, but as many, or as few, teeth as desired may be used.

### Safety Power Plane

A new safety plane designed for fitting doors, sash and transom, according to the R. L. Carter Co. of New Britain, Conn., will do this kind of work five times faster than by hand.

This plane is equipped with a spiral cutter which gives a shear cut and leaves a surface that does not have to be sanded. A special grinding attachment enables the operator to sharpen the cutter whenever necessary. The long shoe for jointer work and the guard for the cutter are approved by the safety councils.

### High Speed Rubber Crawler

The W. A. Riddell Co., Bucyrus, Ohio, has introduced a new rubber crawler designed for use on tractors and power graders and said to give high operating speed, quiet operation and little vibration. This crawler is interchangeable with either the steel

crawler or with rubber-tired wheels on the same tractor axle and each crawler is free to oscillate both the front and rear idler, making it possible to turn either forward or backward with equal facility.

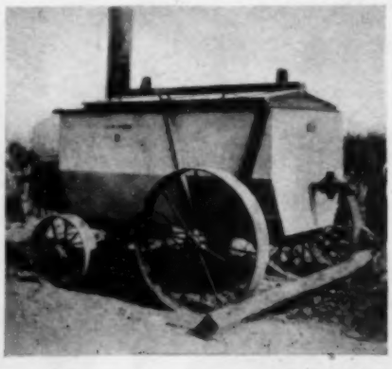
### New Small Ditcher

A vertical boom ditcher that is 4 ft. wide and 11 ft. 6 in. long is now available for trench digging from its manufacturers, the Barber-Greene Co.,

Aurora, Ill. This company claims that the new machine will dig a trench from 5 to 8 in. wide and 3 ft. deep at speeds varying from 15 in. to 12 ft. a minute. Its speed, small size and crawler mounting enable it to cut conduit, service and lateral trenches that would be impossible jobs for a large ditcher.

### Kettle for Pipe Line Work

A "hot dope" kettle that can be pulled through swamps and over rough ground by a tractor or team on pipe line work is one of the latest products of Littleford Bros., Cincinnati, Ohio. This kettle is mounted on 2½-in. square



axles, front and rear and equipped with wide-tired steel wheels. It is securely anchored to the axles and is slung low in order to guard against upsetting. A double cover and a splash plate make the kettle as nearly surge-proof and splash-proof as possible. Littleford torch-type oil burners supply heat for the kettles, which may be had in capacities ranging from 110 to 550 gal.

# BAD WEATHER

## shows how good they are

IT TAKES BAD WEATHER to show how good a money-maker a Universal Truck Crane is. Right now they will help finish up 1930 jobs on time, rain or shine. And when regular jobs are completed the machine need not be idle. • Bridges that need repair, snow removal, ditches that need opening up, steel erecting, coal unloading, highway repairs, all can be handled at a profit by a Universal Truck Crane. • Regardless of the weather, your Universal can get to the job . . . . traveling at motor truck speed on the highway, or with the sure traction of the Motor Truck (Christie) Crawler, when the going is tough.

THE UNIVERSAL CRANE CO. • Lorain, Ohio

*A few hours work erecting steel on a small bridge made money for the owner of this Universal*

*A Universal Truck Crane is always loaded—always ready to go*

*Snow-bound streets are quickly opened up by Universals*

# UNIVERSAL

# Hustle through with CARBIC LIGHTS

*Carbic is distributed by the Union Carbide Sales Company through its national chain of warehouses and is sold by jobbers everywhere.*

**Carbic Flood Lights provide strong, clear, penetrating, diffused illumination and enable work to continue full force with safety after dark.**

**The initial cost of Carbic Flood Lights is low, and operating expense is negligible.**

**Contractors in every branch of industry are hustling through to greater profits with Carbic Lights.**

Technical Publicity Dept. C.M. 12-30 12th floor
205 East 42nd Street, New York, N. Y.

Without obligation, I would like to have additional information on Carbic Lights.

*Name*.....

*Street Address*.....

*City*.....*State*.....

**OXWELD ACETYLENE COMPANY**

*Unit of Union Carbide* UCC *and Carbon Corporation*

NEW YORK

Sales Offices in Principal Cities

THE FLEET OF McELWEE & ROGY, GENERAL PAVING CONTRACTORS, PEORIA, ILL., IS 100% GOODYEAR-EQUIPPED

# WHY DO McELWEE & ROGY

## *use Goodyear Dump Truck Pneumatics?*

**LOOK at the ground where these trucks must travel, and you see why they need husky, strong-pulling, stout-gripping tires.**

**Goodyear Dump Truck Pneumatics are specially built for this kind of hauling. Their All-Weather Treads are extra-broad—they stay on top when loads are heavy and ground is soft. There are heavy vertical bars reaching up on the sidewalls — to armor these tires against the damage of sharp stones and give extra tractive power.**

**Around gravel pits, in road construction, in excavations and around building jobs, these tires have proved their ability to bring out their loads and keep going for a profitable number of miles.**

**Goodyear Truck Tire Service Station Dealers have tires for every type of hauling service. It will pay you to find out which tire is best for your road, load, and speed.**

**ON YOUR NEW TRUCKS SPECIFY GOODYEARS**

**GOODYEAR**

**MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND**

# VALVES NEVER CARBON—OUTPUT NEVER VARIES—*IT'S A DAVEY!*

FORGIVE the owner of a Davey Compressor if he boasts a bit from time to time about "that little pumpin' fool" of his.

He's seen the Davey tackle job after job without a whimper—has watched it plug away faithfully when the going was tough and the hours long. He's kept it at work for months, even years, without so much as cleaning a valve—and he knows from experience that its output has never varied from the day when it pumped out its first cubic foot. *Certainly there is just cause for enthusiasm in such outstanding performance as that!*

It's always the same good Davey, no matter in what type of mounting. There's the sturdy trailer model, for instance —so compact and light that it is exceptionally easy to move up—equipped with a handy clutch which assures easier starting because motor and compressor can be disconnected—powered by a husky motor through two sets of V-type multiple belts. Whether in the trailer mounting, on skids, or astride a tractor, it is the only air compressor of commercial size in which the principle of air cooling is successfully applied to provide more efficient operation, lighter weight and extreme portability.

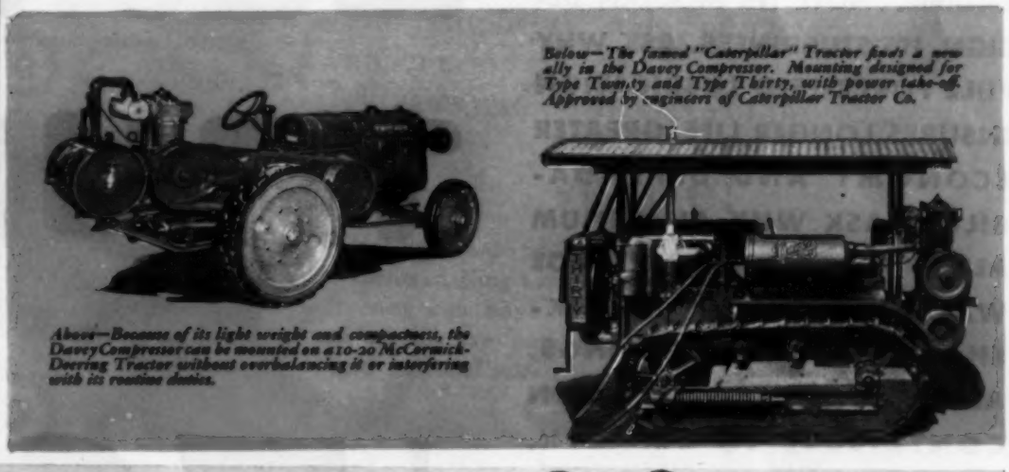
*Continuous efficiency?* Yes, for the chief hindrance to compressor efficiency, carbonization of the discharge valves, is impossible in a Davey. Heat generated inside the compressor is quickly carried off through heads and manifold of special aluminum alloy. Oil in the cylinders, therefore, does not burn, form carbon and cake the valves. No Davey Compressor has ever yet required carbon removal from its valves—no Davey Compressor has ever yet failed to produce full capacity continuously.

Weight? Portability? Power? Just compare the Davey on any points you may choose. One thousand pounds lighter than other portable compressors of similar rating—available in a wider variety of mountings—capable of keeping two pavement breakers; two rotating jack hammers in ordinary service; four tie tampers or other sets of air tools constantly busy.

Not even in these two pages can we illustrate and describe the many types of Davey Compressors, their complete advantages and specifications. That is why you are invited to send for the new booklet which tells the story from beginning to end.

DAVEY COMPRESSOR CO., INC., KENT, OHIO

SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

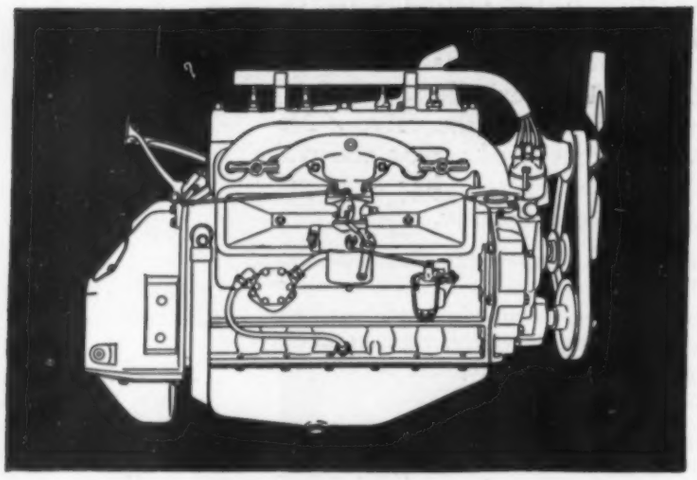


*Above—Because of its light weight and compactness, the Davey Compressor can be mounted on a 10-20 McCormick-Deering Tractor without overbalancing it or interfering with its routine duties.*

*Below—The famed "Caterpillar" Tractor finds a new ally in the Davey Compressor. Mounting designed for Type Twenty and Type Thirty, with power take-off. Approved by engineers of Caterpillar Tractor Co.*

# DAVEY AIR COOLED AIR Compressors

# Compare . . this 48-horsepower engine—



# 1½ ton DODGE TRUCK

**SEE THIS NEW TRUCK. INSPECT THE 48-HORSEPOWER TRUCK ENGINE. NOTE ITS MODERN DESIGN, ITS STURDINESS. ASK WHY FULL FORCE-FEED LUBRICATION INSURES LONGER LIFE, GREATER ECONOMY AND DEPENDABILITY. ASK WHY ALUMINUM ALLOY PISTONS, EXTRA LARGE WATER AREA, RIGID CRANKSHAFT, PRECISION BEARINGS, AND CRANKCASE VENTILATION CONTRIBUTE TO SMOOTH, QUIET, LOW-COST OPERATION.**

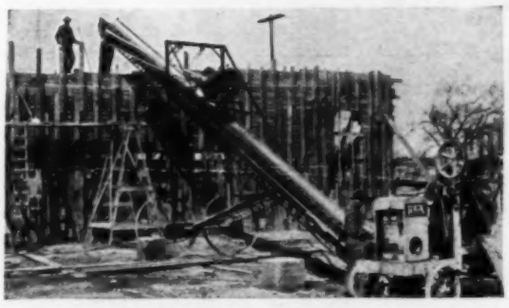
***INSPECT, TOO, THE FULL-FLOATING REAR AXLE, RUGGED 4-SPEED TRANSMISSION, 4-WHEEL INTERNAL HYDRAULIC BRAKES AND MANY OTHER NOTEWORTHY FEATURES OF THIS NEW 1½-TON TRUCK. BUY IT COMPLETE WITH STANDARD OR SPECIAL BODY.***

# $595

***CHASSIS F.O.B. DETROIT. DUAL REAR WHEELS AT SLIGHT EXTRA COST***

**DODGE TRUCKS RANGE IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS**

# NORTHERN KINGS ARE VERSATILE!



A 60-ft. Northern King placing mixed concrete for walls.

A 75-ft. Northern King places mixed concrete in hopper.

Gulfport, Miss. Sea-wall with Northern King conveying concrete to forms.

Placing concrete on part of Chicago Drainage Canal; 60-ft. Northern King in use.

ANY job can be finished faster and more economically if you use Northern Conveyors . . . for materials handling . . . for transporting materials from one point to another on the job . . . on a level plane, to an elevation or decline.

Northern King Conveyors are made to stand the gaff. They are available as stationary equipment or in hand-portable or full power propelled models . . . in any practical length . . . *complete*, and ready to take over every one of your materials handling problems.

Hundreds of Northern Kings in the field testify to their acceptance by construction engineers and contractors . . . under every conceivable condition, in all climates and on all types of projects.

## Write!

**Let us send you data and literature on the Northern King series . . . the finest belt conveyors money can buy! . . . made by specialists whose products are nationally known, nationally used and nationally distributed. Write now!**

NORTHERN CONVEYOR & MFG. CO.
DEPT. 20 JANESVILLE, WIS.

OFFICES

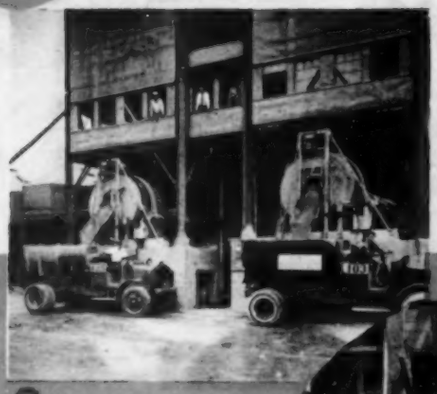
13712 Tyler St., Detroit, Mich. 614 Charleston Bank Bldg., Charleston, W. Va. 528 Oliver Bldg., Pittsburgh, Pa. McCormick Bldg., 332 S. Michigan Ave., Chicago, Ill. 2375 University Ave., St. Paul, Minn. Union Bldg., 1836 Euclid Ave., Cleveland, Ohio.

NORTHERN BUILT BETTER SERVICED BEST MATERIAL HANDLING EQUIPMENT

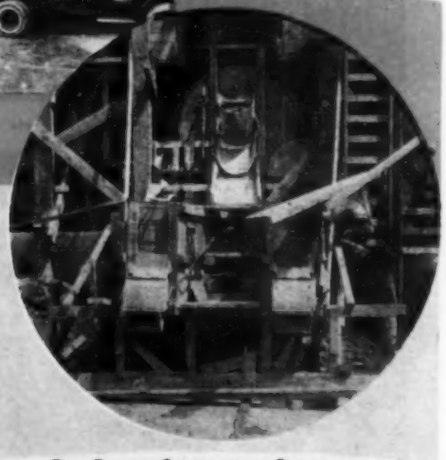
BRANCHES and STOCK

SAN FRANCISCO, CALIF.
NEW HAVEN, CONN.
ROCHESTER, N. Y.

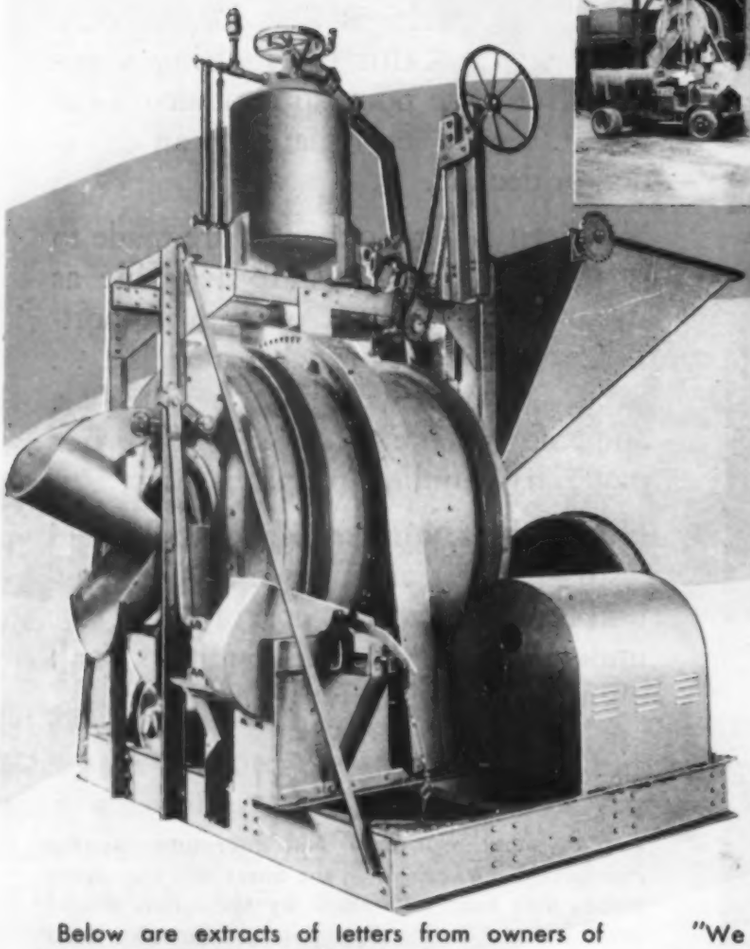
# Ransome



Two of the five 2 yd. Ransomes owned by the General Material Company, of St. Louis, Mo.



The Turner Construction Company used three 42-S Ransome Standard Building Mixers—the Raymond Concrete Pile Co. one 28-S—on the D. L. & W. Warehouse at Jersey City, N. J.



Below are extracts of letters from owners of Ransome 56-S Standard Building Mixers—

"Mixer No. 1 mixed approximately 200,000 cu. yds. at_____before being moved to_____, where it has mixed another 75,000 cu. yds."

---

"We put 250,000 cu. yds. through this Ransome and have no difficulty in maintaining 40 batches per hour, allowing a full minute mix." This mixer, by the way, was *not* equipped with a power discharge. Present mixers, due to improvements and power discharge, *are even faster!*

"We have put 370,000 cu. yds. through two Ransome Big Mixers. They have given entire satisfaction."

---

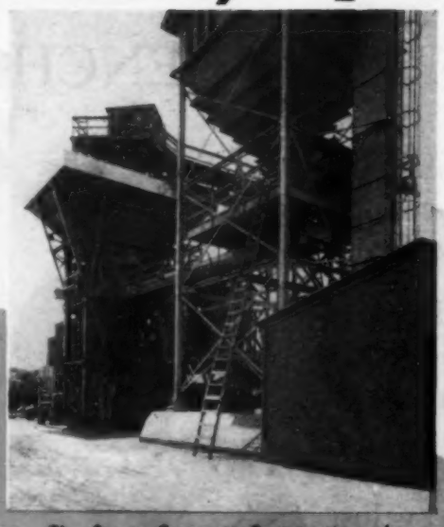
"After mixing 320,000 cu. yds in your two mixers we estimate them 75% as good as new."

---

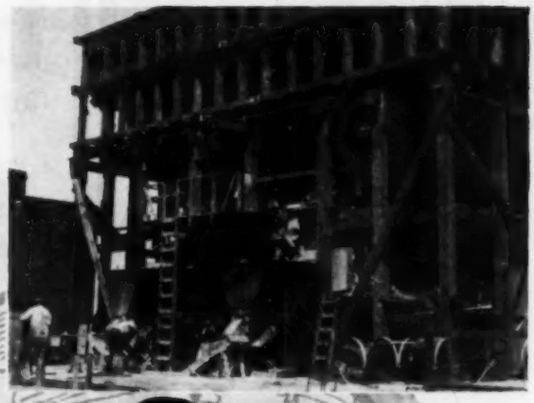
"A 28-S Standard Ransome Building Mixer with a hand discharge maintained a continuous output of 45 batches per hour with a full minute mix."

**Speed...Endurance...L—O—N—G LIFE!**

# BIG MIXERS
# 28-S, 42-S, 56-S and 84-S
## for LONG LIFE



The Super Concrete Corporation of Washington, D. C., has a Ransome 84-S. They wired the following response to an inquiry from a prospective purchaser—"Have been operating for 60 days without any trouble whatever—We do not think you will make a mistake by buying a Ransome Mixer."



Two Ransome 28-S Mixers ran every day without a breakdown from April 3rd to October 1st, pouring 50,755 cu. yds. Contractor —Raymond Concrete Pile Co.—San Francisco Bay Toll Bridge.

RANSOME

REG. U.S. PAT. OFF.

AMERICA'S FIRST MIXER

The Wiley-Maxon Construction Co. used two 28-S Standard Building Mixers on the longest multiple arch concrete highway bridge in the world, Columbia to Wrightsville, Pa., over the Susquehanna River.

Send for Bulletins on Ransome Big Mixer

**Ransome Concrete Machinery Company**

**1850—Service for 80 Years—1930**

**Dunellen** **New Jersey**

USED ON THE PIERS OF NEW HUDSON RIVER BRIDGE AT 176TH ST., NEW YORK CITY.

IN USE ON NEW SUBWAY CONSTRUCTION IN NEW YORK CITY.

USED EVERYWHERE FOR PUMPS.

# Wherever Nuts Are Turned Time and Money Can Be Saved

By Using

THE

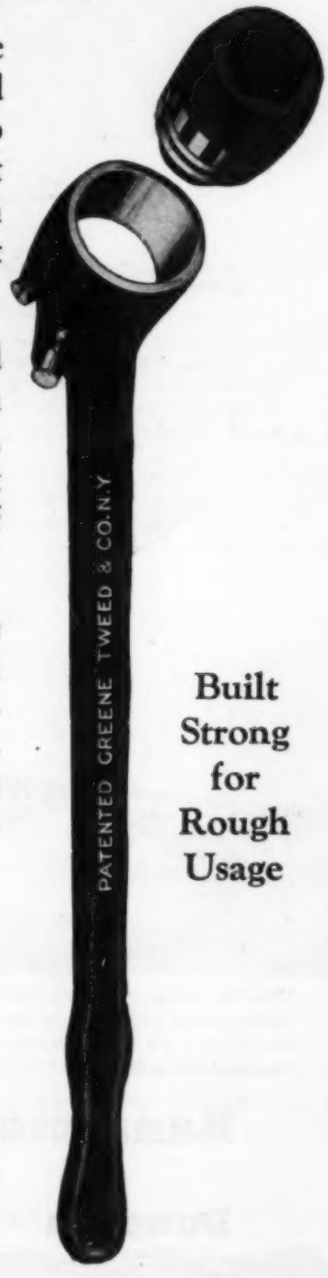
# FAVORITE Reversible Ratchet WRENCH

It works with the quick, straight ahead ratchet movement, and wrench head does not leave the nut until operation is completed.

Compare this with the time wasted by the old fashioned open end wrench that has to be removed from the nut at every part turn for a fresh hold — unnecessary lost motion.

Has the socket form of head that encompasses the nut on all sides with equal pressure. This tends to prevent wrench from slipping off nut.

Leading Contractors use the "FAVORITE" Wrench for speeding up the nut-turning portion of the contract, especially where the saving of time is a very important consideration.




**Built Strong for Rough Usage**

*Write us for full particulars.*

## Greene, Tweed & Co.

*Sole Manufacturers*

109 Duane St., New York

# NEW FROM THEW

The precision 2-speed hoist line control for Lorain cranes. An extra feature for hook block work calling for extremely accurate placing of the load. Applicable to all Lorain crawler or locomotive cranes...old and new. Hoist or lower the load at standard high speed . . . then by simply changing levers move it up or down a fraction of an inch per second under positive power control. Eases the load into exact position with greater precision, with greater safety!

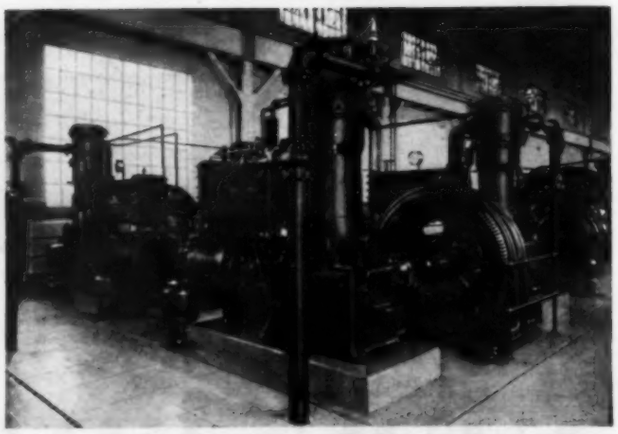
THE THEW SHOVEL COMPANY
LORAIN, OHIO

**THEW** THEW CENTER DRIVE **LORAIN**

THE No. 1½—36" Lowell "Red Socket" Steel Socket Bridge Wrench has proven itself extremely successful for bolting heavy rail. We believe this photo tells a complete story, showing the distinct advantages of this wrench over an open end type of track wrench. Why not *pump your track bolts* home with a Lowell?

*Send for the new complete Catalog "R"*

LOWELL WRENCH COMPANY
WORCESTER MASS.



# True Service *forestalls* trouble

The user of Sullivan compressed air equipment enjoys three-fold insurance against interrupted production.

FIRST—Sullivan compressed air equipment is designed and built to stay on the job—

SECOND—Sullivan compressed air equipment recommendations are determined by the user's needs—as the Sullivan organization knows that its own interest is inseparable from that of the user—

THIRD—The Sullivan Machinery Company recognizes a continuing responsibility for its compressed air equipment after installation—

On this three-fold conception of service, the Sullivan Machinery Company has grown for 79 years.

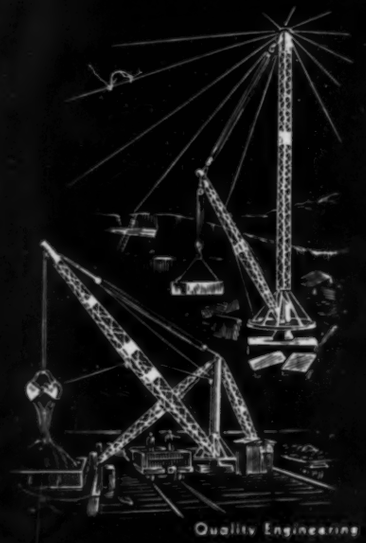
**This inspiring picture on heavy stock, free to Executives**

*Write for the Sullivan Sea Picture.*

SULLIVAN

Sullivan Machinery Company
816 Wrigley Bldg.
CHICAGO

AMERICAN
STEEL
DERRICKS
Guyed—
Stiffleg




AMERICAN
HOIST & DERRICK CO.
Saint Paul, Minnesota
AMERICAN GOPHER SHOVEL-CRANE

# Dietz Lanterns Stay Lighted

YOU need Dietz Red Lanterns — lanterns that can be left on road construction at night with confidence that they will be found burning in the morning—whatever the weather may be.

The ultimate difference in cost between a scientifically correct Dietz Lantern and something less reliable might be thousands of dollars in case of accident.

For economy and utmost safeguard use Dietz Red Lanterns for night warning duty.

R. E. DIETZ COMPANY
NEW YORK
*Largest Makers of Lanterns in the World*
FOUNDED 1840
DIETZ LANTERNS

# . . . For Maximum Drainage Economy *use*

(Above) Solving drainage problems — laying half round, flat bottom GOHI Culverts in streets of Alameda.

(To left) Installing 24" GOHI Corrugated Culvert on Dixie Highway near Falmouth, Ky., made necessary because of collapse of rigid type.

GENUINE OPEN HEARTH IRON — GOHI — TRADE MARK — PURE IRON - COPPER ALLOY — REG. U.S. PAT. OFF.

(Meet copper-bearing pure iron requirements in all accepted specifications for corrugated metal culverts.)

# Corrugated Culverts

THE ever-increasing cost of modern highways is forcing attention on construction economies.

Out of costly experiments with various types and kinds of culvert, has come the conviction that GOHI Corrugated Culverts make for economy in highway construction by lowering drainage costs.

Made of Genuine Open Hearth Iron — pure iron-copper alloy — these culverts give maximum resistance to the corrosive influence of soil, water and weather. Their reasonably low first cost; low-cost installation; flexibility that resists settling or shifting earth and vibration from traffic; demonstrated durability in countless installations;—these are factors that weigh heavily in lowering your drainage investment.

Whatever your requirements, get all the facts about GOHI Culverts. The more carefully you investigate and compare advantages and costs, the stronger will be your conviction that GOHI is *the* culvert for you to buy.

**Use GOHI Culverts for**

Reservoir Syphons and Outlets
Highways
Real Estate Developments
Golf Courses
Airports
Railway Roadbed Drainage
Storm Sewers
Drainage of reclamation areas
Temporary or permanent flumes.

© 1930, G. C. M., Inc.

**GOHI CULVERT MANUFACTURERS, Inc., Newport, Ky.**

**Lincoln Steel and Forge Co.**
St. Louis, Mo.

**The Newport Culvert Co.**
Newport, Ky.

**The Pennsylvania Culvert Co.**
Philadelphia, Pa.

**Denver Steel & Iron Works Co.**
Denver, Colo.

**A. N. Eaton, Metal Products**
Omaha, Nebr.

**Feenaughty Machinery Co.**
Portland, Oregon

**Tennison Brothers**
Texarkana, Ark.

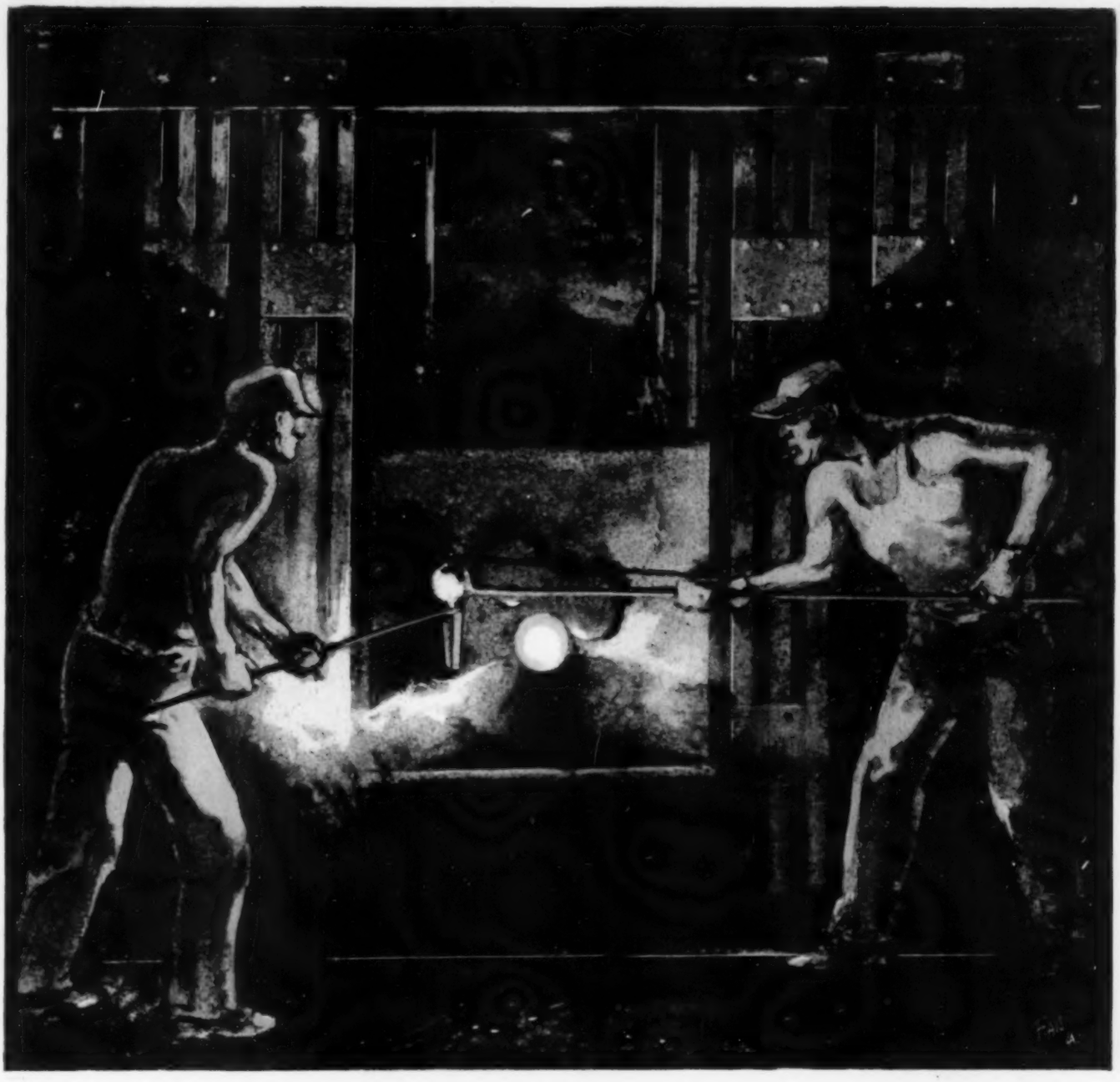
**Capital City Culvert Co.**
Madison, Wis.

**Central Culvert Co.**
Ottumwa, Iowa

**Roanoke Sales Corp.**
Roanoke, Va.

**St. Paul Corrugating Co.**
St. Paul, Minn.

**Tennison Brothers**
Oklahoma City, Okla.



# Sampling a melt of Roebling Acid Steel *for laboratory check*

WATCH the open-hearth furnaces in the Roebling steel mill and you will see the pictured procedure repeated time and time again. It is sampling the melt for a chemical check in the laboratory.

Wire rope can be no better than the steel of which it is made. For Roebling "Blue Center" Wire Rope the acid steel must measure up to exceedingly high standards. Its quality is closely controlled in small open hearth furnaces, and it is repeatedly subjected to a careful chemical check.

Hundreds of thousands of feet of Roebling "Blue Center" Steel Wire Rope are produced yearly by the most modern of production methods. But it is old-fashioned thoroughness that protects its quality every step of the way.

**ROEBLING** **WIRE ROPE**

"BLUE CENTER" STEEL

# On this Giant Shovel

## ...*"any" wire rope won't do!*

1600 TONS OF STEEL muscle and sinew! A crawling monster that annihilates mountains of material with incredible ease and swiftness. That can fill 20 trucks of ordinary size, with each disgorging of its cavernous dipper!

This, in substance, is the Roebling-equipped power shovel shown...operated by the United Electric Coal Companies.

Obviously, in rigging such a shovel, the selection of wire rope is a most important procedure. For the rope required must withstand exceptionally heavy stresses and strains ...and survive punishing service without faltering.

That the makers equipped this giant shovel with Roebling "Blue Center" Steel Wire Rope is deeply significant...and indicative of their confidence in its superiority.

JOHN A. ROEBLING'S SONS COMPANY

WIRE...WIRE ROPE...WELDING WIRE...FLAT WIRE
COPPER *and* INSULATED WIRES AND CABLES

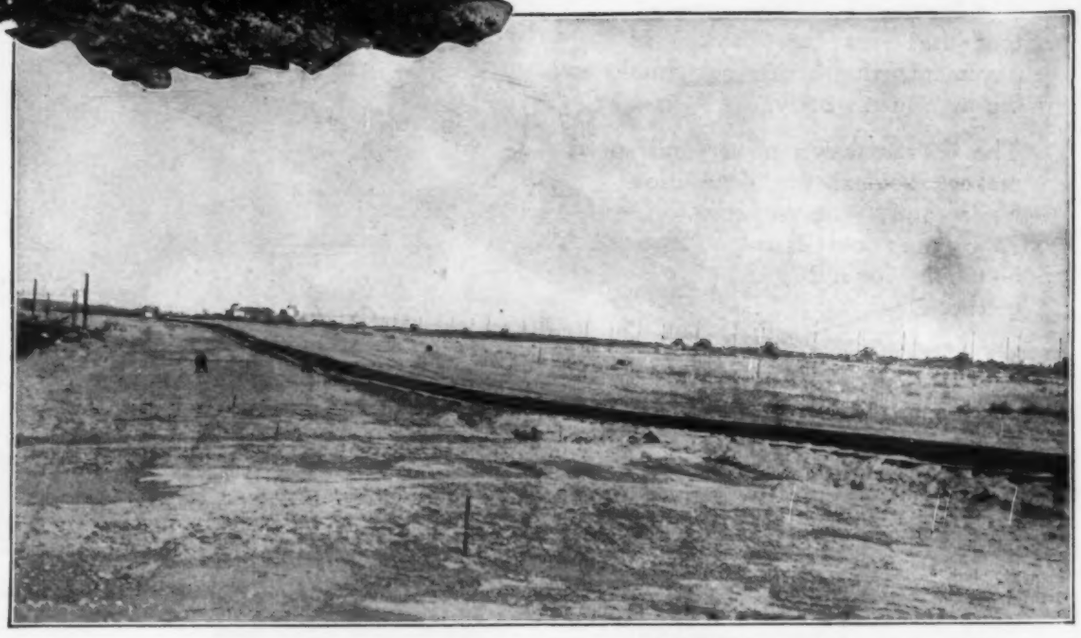
TRENTON, NEW JERSEY

*Branches in Principal Cities*

**ROEBLING** **WIRE ROPE**

"BLUE CENTER" STEEL

# The World-Famous Wehr Helps Build the World's Fair



*The Wehr daily subgrades 5000 yards of sand on this new double highway through the World's Fair Grounds.*

THE Chicago World's Fair schedule calls for five miles of new double drive through soft lake sand—5000 yards of fine grading every day. A new Wehr Grader with Wehr J-4 Crawlers, owned by Contractor John A. McGarry, is doing this big job easily and efficiently with the aid of 6 to 8 men. Before the purchase of the Wehr, 20 to 25 men were necessary for this work.

Digging and refilling a foot-deep trench, for several miles of pipeline to be used in flooding and settling the sand, was only one day's work for the Wehr. On this job it replaced a crew of 12 men.

Equally important savings in time and labor costs will be secured with the Wehr when stone-spreading, 14-foot shoulder work, and 14-foot parkway grading are required for the new highway.

Wehr Equipment quickly pays for itself on any kind of road work. Wehr Graders, pull-type or motored, and Wehr Road Rollers can be profitably adapted to *your* work.

*Heavy fill-in and shoulder work are easily accomplished with the Wehr.*

*The reconstruction of old Fort Dearborn for the World's Fair is progressing rapidly.*

*On work of this type the Wehr proves its stamina and rugged construction.*

WEHR COMPANY, MILWAUKEE, WIS.
Factory, CUDAHY, WIS.

# WEHR

## Road Building and Maintenance Equipment

# CRACK DOWN! with a C7 PAVING BREAKER

A powerful, smashing tool is the Cleveland C7 Paving Breaker! A slashing tool that rips great cracks in pavements, that breaks out chunks as big as a man's body.

The C7's amazing power and speed makes it ideal for demolition work and reduces costs 75% over old fashioned hand methods.

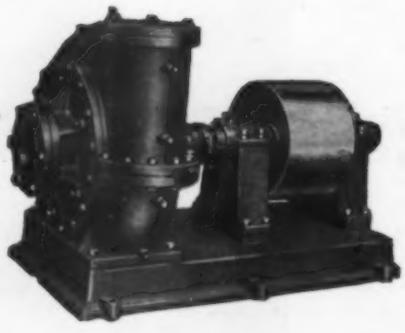
Write for demonstration.

THE CLEVELAND ROCK DRILL CO.
*3734 East 78th Street*
CLEVELAND, OHIO

**CLEVELAND ROCK DRILLS**

*Distributors in 111 cities in the U. S. have parts in stock for immediate service.*

# MORRIS CENTRIFUGAL PUMPS



**Morris Machine Works, Baldwinsville, N. Y.**

**Originators of centrifugal pumps, both single and multi-stage, and builders for practically all purposes since 1864**

**Branch Offices:**—New York, 225 W. 34th St.; Philadelphia, Witherspoon Bldg.; Cleveland, 1367 E. Sixth St.; Chicago, 228 N. LaSalle St.; Boston, 79 Milk St.; Pittsburgh, 320 Second Ave.; Detroit, Fisher Bldg.; Charlotte, N. C., Realty Bldg. Representatives in other industrial centers.

MORRIS Solid-lined Pumps are specially built for handling highly abrasive material such as sand and gravel.

The special features of these pumps that assure long, efficient service with minimum maintenance expense include the patented renewable lining of suitable alloy, the simple sturdy construction, and many provisions for high efficiency, convenient adjustment and ready accessibility.

These pumps, together with the many other Morris Centrifugal Pump types, are giving dependable and economical service in thousands of installations.

*Send for Bulletins.*

# FINANCING
## *Single Units or Complete Plants*

**COMMERCIAL EQUIPMENT CORPORATION**

**Commercial Equipment Corporation, affiliation of Commercial Credit Companies, provides a further financing service to industry. Its method of financing complete installations as a unit, requiring two or more varying types and makes of equipment, has been approved and endorsed by many of the country's leading engineers.**

**WITHOUT affecting your cash reserves, or influencing your credit lines, you can modernize your plant through Commercial Credit Service.**

**Whether modernization requires one or more units of machinery—even a complete plant, Commercial Credit Service will allow payment from the new equipment's increased earnings.**

**It will pay you to know about this convenient industrial financing service. Full information will be promptly given on request.**

# COMMERCIAL CREDIT COMPANIES

**COMMERCIAL BANKERS**

**CASH CAPITAL and SURPLUS $58,000,000**

COMMERCIAL CREDIT COMPANY - - Baltimore
COMMERCIAL CREDIT CORPORATION - New York
COMMERCIAL CREDIT TRUST - - - - - Chicago
COMMERCIAL ACCEPTANCE CO. - - Indianapolis

COMMERCIAL CREDIT COMPANY, Inc., New Orleans
COMMERCIAL CREDIT COMPANY - San Francisco
KEMSLEY, MILLBOURN & CO., Ltd. - New York
CONTINENTAL GUARANTY CORP., Ltd. - Montreal

MIDWEST COMMERCIAL CREDIT COMPANY, Detroit, Des Moines, Milwaukee, Sioux Falls

NATIONAL HEADQUARTERS, Baltimore

B-2

COMMERCIAL CREDIT COMPANIES, Baltimore, Maryland
Give us full information, without obligation, about Commercial Credit Plans.

*Firm Name* _____ *By* _____

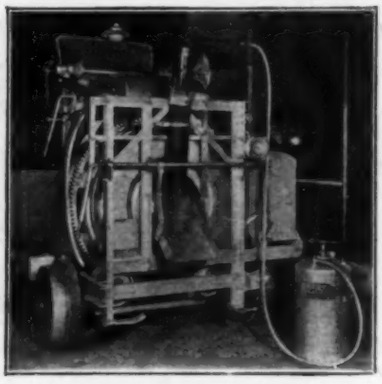
*Address* _____ *Title* _____

Hotstuf
TRADE MARK

# CONCRETE HEATERS

Designed to operate with all sizes and makes of concrete mixers, either tilting or non-tilting.

Mohawk Torches are made with the celebrated patented removable coil feature and the patented non-clogging tip.



HAND TORCHES—WATER HEATERS—SALAMANDERS

WRITE FOR CATALOGUE

## MOHAWK ASPHALT HEATER CO.

SCHENECTADY NEW YORK

# *You Wouldn't Buy a Grader for This—*

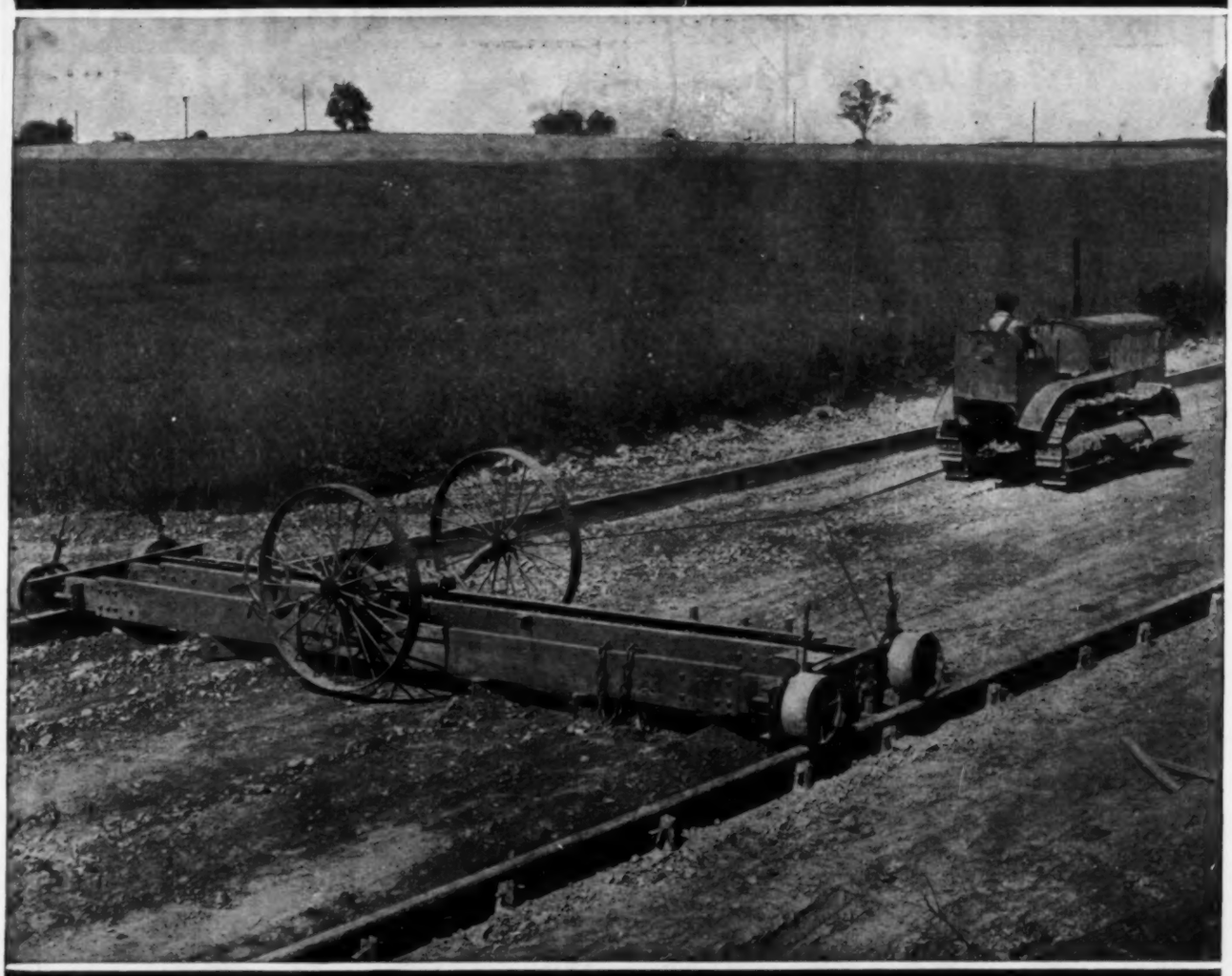
But, if you have a WARCO you can do it very well indeed. For heavier snows a WARCO V-Type Snow Plow, that is controlled from the operator's station, can be mounted in front. WARCO Steel or Rubber Crawlers help a lot, too.

WARCO
BUCYRUS OHIO

Let us tell you more about these year around Road Building and Maintaining Machines.

## W. A. Riddell Company, Bucyrus, Ohio

*Power and Drawn Graders, Wheeled Scoops, Rear-Type Crawlers for Tractors*



# What savings in this PICTURE ... and WHY?

*Prices—f. o. b. Peoria, Illinois*

| | | | |
|---|---|---|---|
| TEN . . . . | $1100 | TWENTY . . | $1900 |
| FIFTEEN . . | $1450 | THIRTY . . | $2375 |
| SIXTY . . . | $4175 | | |

**Caterpillar Tractor Co.**

PEORIA, ILLINOIS, U. S. A.

Track-type Tractors Combines Road Machinery

*(There's a "Caterpillar" Dealer Near You)*

CATERPILLAR
REG. U.S. PAT. OFF.
TRACTOR

**ONE MAN, a "Caterpillar" Twenty and scraper build the rough grade—the same man and tractor finish with sub-grader, return to scraper, remove windrows, and the job is done—with less effort, at greater speed, and at big savings. Ground-gripping, non-slip traction and plentiful, nimble power win these rewards on all manner of jobs—"Caterpillar" track-type Tractors save men, money, minutes.**

## *Your name stamped on this book FREE*

At no additional cost to you, we will stamp your name, or a friend's name, in gold on the front cover of every copy of Underwood's Estimating Construction Costs ordered from this advertisement. This is a special Christmas offer, limited to acceptance before January 1, 1931.

## *Estimate construction costs by this quick, simple chart system*

Contractors — engineers — estimators—appraisers! Here is a new time and labor saving method of estimating construction costs. A glance at a chart takes the place of long and involved figuring in estimating labor and material costs for every branch of construction work.

# Estimating Construction Costs

By G. Underwood

Construction Engineer, Author of "Standard Construction Methods."

**630 pages, 6x9,**
**443 charts, 36 illustrations,**
**flexible binding, $6.00**

ENJOY this new tool that eliminates time and effort from estimating construction costs. All the tedious and detailed figuring, formerly a part of estimating, can now be avoided by consulting the clear, systematic charts that make up the larger part of this book. Furthermore this book presents a complete guide to estimating construction costs. It describes what costs should be applied—takes up the processes of estimating in detail—gives a complete model estimate that illustrates the principles advocated in a step-by-step demonstration of this new and simplified method.

The 443 charts in this book cover all kinds of construction work, including structural, machine erection, concrete working, and all the building operations. A chapter on transportation includes information and charts not readily available elsewhere and covers the cost of shipping materials by freight and express. There are also charts covering the moving of materials by hand, barrow, cart and truck. An entire chapter shows how to figure overhead. There is useful data on compensation and insurance costs in estimating. An entirely new method of estimating the cost of pipework is given, based on the number of joints.

Do you want to make a friend a gift combining personal thoughtfulness with real utility? Do you want a copy of Underwood that you will doubly prize? Then take advantage of this free stamping offer. Send the coupon today. (Proper remittance should be enclosed with orders and, of course, stamped copies are not returnable.)

### SPECIAL HOLIDAY OFFER COUPON

**McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York.**

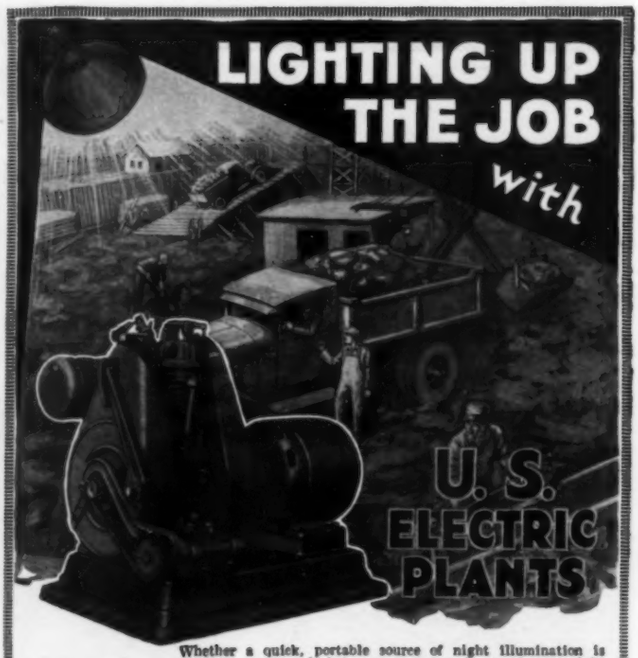
Send me Underwood's **Estimating Construction Costs**, with name stamped in gold on the front cover. I enclose $6.00 and understand that stamped books are not returnable. (This offer expires Jan. 1, 1931.)

.....
(Name to be stamped. Please print)

Name .....

Address .....

City and State ..... C.M. 12-30




**$137.00** is the list price for the above 350 watt model capable of lighting 14 25 - watt lamps. No batteries necessary.

Whether a quick, portable source of night illumination is needed . . . or a lighting arrangement for consistent, night operation to keep up construction schedules—"U.S." Electric Plants fill the bill 100%!

Their steady current output, flickerless light and constant voltage under all load conditions have made them preferred over all other units for lighting up the job.

The "U.S." Line offers models for any purpose. Watt capacity ranges from 350 watts up to whatever size is needed. An interesting booklet entitled, "Lighting up the Job" has been prepared specially for engineers and contractors. Write for it.

*Dealers write for franchise particulars and special discounts.*

**UNITED STATES MOTORS CORP.**
130 Nebraska St. *Est. 1890* Oshkosh, Wis.

## *LIFTS . . . SWINGS . . . CARRIES . . . HAULS*

Sturdy, mobile, compact, the Loadmaster is an invaluable asset in the hoisting and transporting of moderately heavy loads. It can maneuver easily in confined areas. The swinging boom, requiring no stiff-legs for side lifts, makes simple the "spotting" of loads. With the additional feature of being able to haul, the Loadmaster can accommodate trailers, etc., even while carrying a load itself in suspension. Send for catalog.

**FREDERIC H. POOR, Inc.**
342 Madison Ave., New York City

# LOADMASTER
## SWING-CRANE

July 24, 1930 Market—ENGINEERING NEWS-RECORD—Place 51
TRACTOR SHOVEL convertible ⅜ yard
MODEL K SHOVEL convertible scant ½ yard
MODEL K-2 SHOVEL convertible full ½ yard
MODEL R SHOVEL convertible ¾ yard
4 ACES
in the shovel field
A complete range of shovel capacities from ⅜ to ¾ yard machines—ready at all times to meet your earth moving problems.
And it is a problem to use a large capacity machine when a smaller shovel will do the same work, with less moving and hand-trimming. BAY-CITY shovels are built by experienced manufacturers—built to meet YOUR requirements.
There are refinements and features of design and construction in BAY-CITY machines that give you fast swing, fast hoist and crowd and quick travel. ALL BAY-CITY shovels are convertible, easily assembled and economical. BAY-CITY shovels are at work everywhere and making good doing unusual jobs. Jobs done by heavier machines—jobs done by hand—all sorts of jobs where dependable, economy service is demanded. They are money-makers.
Before buying your next shovel investigate the "BAY-CITY Family of Fast Workers"—Write now for catalogs and complete information.
BAY CITY SHOVELS, Inc.
New York Office—302 Broadway BAY CITY, MICH.
BAY-CITY SHOVELS

# AND NOW!

## MODEL-S—
## full size one-yard
## SHOVEL

**This new addition to the BAY CITY *family* widens the range of operation of these *fast workers* from ¾ yard to 1 yard.**

**Model S full size 1 yard is the big brother of Model R. It is built like the original but is heavier and more rugged to take care of the larger 1-yard capacity.**

**It is full revolving and convertible to shovel, crane, trench-hoe, clamshell, dragline or backfiller.**

**For speed, power, stability and dependable service Model S has no superior in its class. Powerful motor unit, full length crawlers, unit-cast car body and revolving machinery base. Built throughout as BAY CITY is known to build thoroughly dependable shovels.**

***Write for complete details.***

BAY CITY SHOVELS, Inc.

**New York Office—302 Broadway** **BAY CITY, MICH.**

# BAY-CITY SHOVELS

THE BAY-CITY FAMILY OF FAST WORKERS

# BROWNING

BROWNING utility knows no limitations! You can put a Browning Truck or Crawler Crane on any handling job and get more productive work done—and at a lower cost per working hour.

Brownings are fast and easy to handle; economical in operation and in upkeep; and long in point of serviceability.

We will be glad to show you how a Browning will save for you.

THE BROWNING CRANE CO.
16226 Waterloo Rd., Cleveland, O., U.S.A.
Branch Offices: New York, N. Y., Chicago, Ill.
*DISTRIBUTORS:*
Birmingham, Portland, Syracuse, San Francisco, Charlotte, N. C., Kansas City, New Orleans, Los Angeles, Indianapolis, Montreal, Toronto, Toledo, O., Albany, Tulsa, Okla., Baltimore, Victoria, B. C., Minneapolis, Tacoma, St. Louis, Pittsburgh

▲ Browning Crawler Crane handling crushed stone in Batavia, N. Y. This Browning loaded a 55 ton car in 14 minutes.

## LOCOMOTIVE – TRUCK – CRAWLER CRANES
## GAS – STEAM – ELECTRIC

# COVULC

## halves maintenance expense on all conveyor equipment

COVULC—a new self-curing rubber compound—is used to resurface all types of worn conveyor equipment.

COVULC triples the life of present equipment and eliminates extensive replacements—keeps your plant on full time, because you can quickly make repairs after working hours.

### We Can Prove It to Your Satisfaction

To find out the operating efficiency and big savings afforded by COVULC *in your own plant, entirely without risk,* simply fill in the coupon. We will send you the COVULC booklet, describing COVULC in detail—and how you can apply COVULC to any worn belts, hoppers, chutes, etc. Two big Eastern corporations found COVULC tougher than boiler-plate.

THE HITCHCOCK COMPANY, INC.
48 Pearl St., Boston, Mass.

Send me information on COVULC, the self-curing plastic rubber compound.

We are interested in COVULC for use on.....

.....

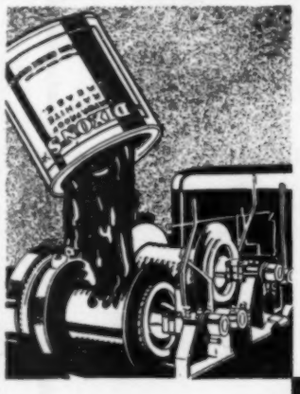
(Name of Firm).....

(Address) .....

(City and State).....

(Signature) .....

(Position) .....CM-12




# DIXON'S WATER-PROOF GRAPHITE GREASE

*FOR WIRE ROPE, GEARS, CHAINS, PUMP PLUNGERS ETC.*

## ASSURE THAT EXTRA PROTECTION NEEDED IN .. *LUBRICATING CONSTRUCTION EQUIPMENT*

IN THIS DIXON Product, a lubricant is available combining the highest grade mineral stock with DIXON'S Flake Graphite.

Together, this combination possesses adhesiveness, and durability—impervious to water, alkali or acid. It cannot be washed off or thrown off. Penetrates to the innermost strands of wire rope and eases internal friction.

Especially advantageous for the water ends of pump plungers, gears, chains, etc.

A trial order will enable you to derive the full benefits of this DIXON lubricant.

### OTHER DIXON PRODUCTS

Graphite Seal — Silica Graphite Paint
Pipe Joint Compound — Graphite Cup Grease
Flake Graphite

**Joseph Dixon Crucible Co.**
Established 1827
Jersey City — New Jersey

TRADITION

PROGRESS

" 'BUILDINGS Going Up By Arc Welding' says a headline in my paper and they talk of a couple going up in the West and a couple in the East.

I'm beginning to wonder, Lad, how much there really is to this welding of buildings."

"Not nearly as much to it as in riveted construction, Pop.

Let me take that pencil and make a drawing for you comparing the design of a riveted beam seat and a welded one.

Both are designed for a load of 45,000 pounds.

The riveted seat requires 2 angle members and a filler plate, and to fabricate it you punch 4 pieces and drive 8 rivets.

The welded seat requires but one member . . . a piece of a T shape.

You fuse this into the column with 18 lineal inches of 3/8" fillet weld.

So there's not as much in the arc-welded seat by 2 members and by a lot of labor.

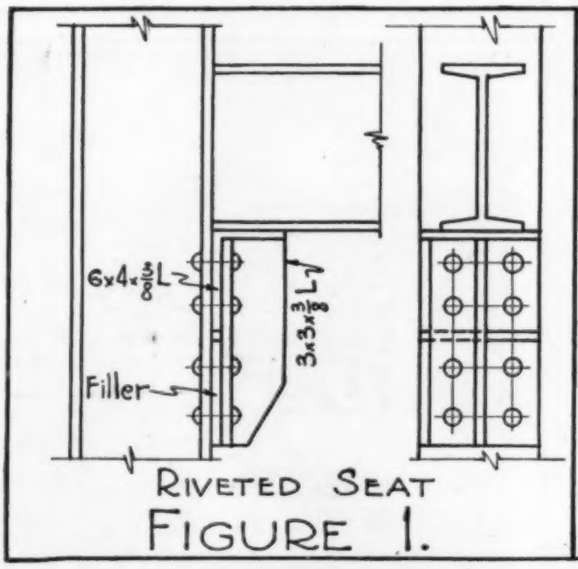
I got that from Lincoln's "Studies in Structural Arc Welding" which is a series of plates for architects, engineers and fabricators . . . mailed without charge to those with welding work under way, as well as those 'way under-worked in welding."

*Write for a complete set of "Studies in Structural Arc Welding"*

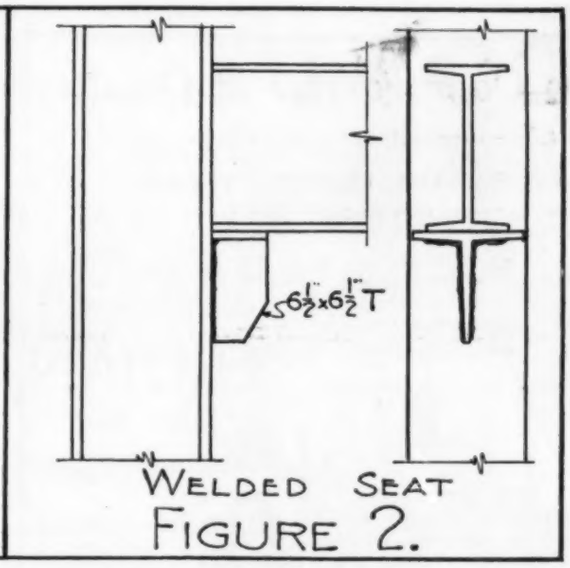
**THE LINCOLN ELECTRIC COMPANY**

**Department No. 32-12** **Cleveland, Ohio**

*World's Largest Manufacturers of Arc Welding Equipment* W-160




RIVETED SEAT
FIGURE 1.




WELDED SEAT
FIGURE 2.

# LINCOLN "Stable-Arc" WELDER

Lincoln "Stable-Arc" welder, motor-driven portable truck type, for use where electric power is available.

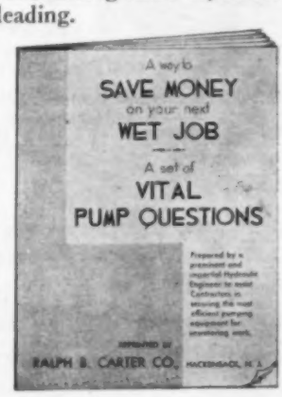
# A Question of Capacity

Is the maximum capacity of the pump as great as can be secured with the power used? In other words, *"will I pay for more power than is needed for the same work on another pump?"*

**ANSWER**

Check carefully on actual capacities under operating conditions, not catalog rated capacities which are often misleading.

**We will gladly run comparative capacity tests on HUMDINGER Pumps when and where you designate. They are guaranteed to have as great or greater capacities than any equal sized outfit. 600 G.P.M. at 15 ft. suction lift on a 4 in. pump may not mean 600 G.P.M. when operating under an actual lift of 15 ft. through 4 in. suction hose.**




This is one of a series of questions and answers which are contained in the illustrated booklet, "A WAY TO SAVE MONEY ON YOUR NEXT WET JOB." It is free to you. WRITE FOR IT BEFORE YOU PURCHASE YOUR NEXT PUMP.

**Ralph B. Carter Co.**
192 Atlantic St. HACKENSACK, N. J.

THE
# Toledo Torch

**— the ONLY safety light with the low-cost, constant-flare Economy Burner.**

**Insist on the Genuine Toledo Torch. If your dealer can't supply you, write us.**

**Stormproof**
**Theftproof**
**Economical**
**Unbreakable**
**Self-righting**

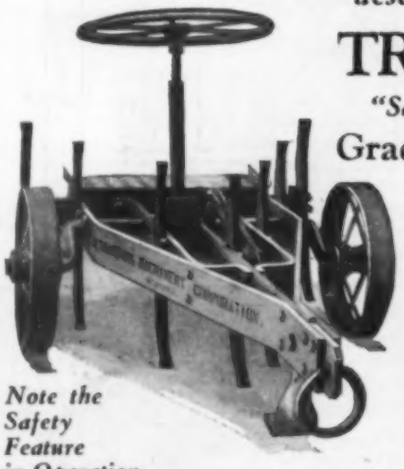
TPS **The Toledo Pressed Steel Co.**
TOLEDO OHIO
Save with Steel

Manufacturers of The Toledo Horse—the ideal highway barricade

# *No Compromise of Quality*

YOUR TRACTOR CAN
DO NO MORE THAN
THE TOOL IT PULLS

***Write us for Special Booklet describing . . .***



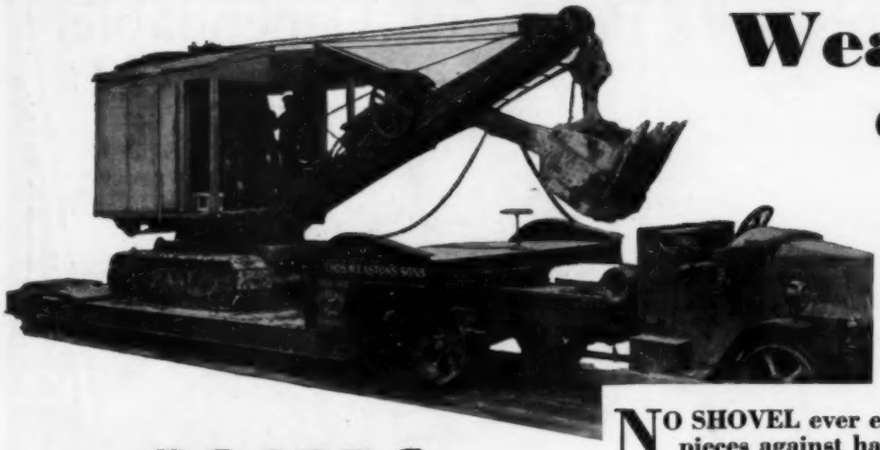
*Note the Safety Feature in Operation*

## TROJAN
*"Safety First"*
**Grade-Rippers**

No other tool, comparable in size and weight, has its strength and durability to stand up under any and all conditions.

**CONTRACTORS MACHINERY CORPORATION** Batavia, N. Y.

**Schramm Inc.,** WEST CHESTER, PA.
"Representatives in all principal cities"



# Wear it out on the job

## —*Not on the Pavement!*

**ROGERS**
World's Standard
HEAVY DUTY
**TRAILERS**

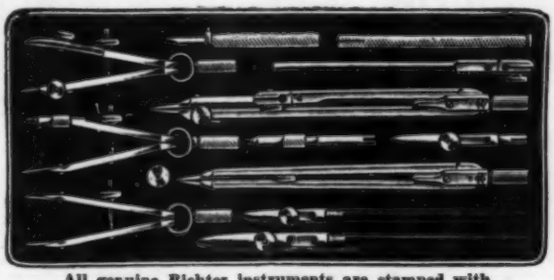
**NO SHOVEL ever earned a nickel pounding itself to pieces against hard pavement. The only time it's operating at a profit is when it's operating *on the job.* Take it there, with the least labor, in the shortest time, on a ROGERS TRAILER.**

**Moving equipment on its own power not only means greater deterioration than when on the job, but also costly idleness of men and machinery while en route.**

**Rogers—the World's Standard Trailer of the Carryall type—is designed for easy loading and fast moving of all types of equipment. Capacity 10 to 100 tons. Write for catalog.**

**ROGERS BROTHERS CORPORATION**
**106 Orchard St. Albion, Penna.**

# RICHTER
## PRECISION INSTRUMENTS



All genuine Richter instruments are stamped with this trade mark →

These *high grade* drawing instruments are the choice *today* of discriminating engineers and draftsmen just as they were *fifty years ago.*

**Unequalled for Quality and Accuracy**

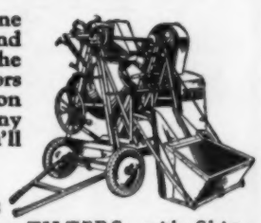
The finest grade of Rolled German Silver and English Steel used exclusively in their manufacture. Expert workmanship guarantees the perfection of every mechanical detail. Features found in no other make of drawing instruments insure *exact adjustment, easy manipulation and unusually long life.*

***Send for printed matter with full details***

**KOLESCH & CO.**
AGENTS IN U. S.
138 Fulton St., NEW YORK

# Saving only *Starts* with the Price

**YOU can't beat this genuine Jaeger trailer as a "buy". And it's even harder to beat it on the job, mixing concrete. Contractors say there's a Jaeger 3½S trailer on every street in town. Talk to any man who owns one and you'll know why.**



**NON-TILTERS** 7, 10, 14, 21, 28, 56S sizes. Ask about 1-bag Speed King trailer.

**TILTERS**—with Skip Shaker loader and Dual-Mix drum. Sizes 3½, 5, 7, 10 ft.

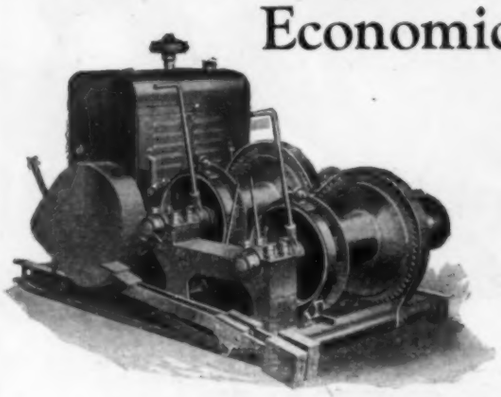
***Send for Catalog, Prices, Terms.***

**THE JAEGER MACHINE CO.**
800 Dublin Ave. Columbus, Ohio

HOISTS BUILT ESPECIALLY FOR CONTRACTORS

DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE

# Dake Hoists are Powerful, Dependable, Economical!



Tomorrow's profits come from today's decisions. Decide today to investigate the advantages and economies that come with the use of DAKE HOISTS.

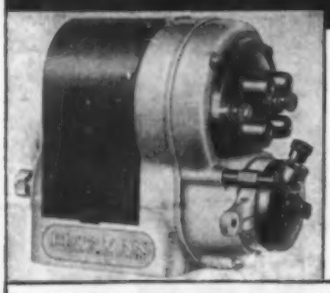
Investigate DAKE arc-welded steel frames, steel drums, extra horse power per pound of weight, unusual portability and economical operation. Investigate the reasons why DAKE HOISTS pay such large profits per dollar invested.

Write today for the new DAKE catalog. Inform yourself about DAKE gasoline and electric hoists ranging from 2 to 27 h.p. and priced from $250.00 to $1,900.00 f.o.b. Factory.

**DAKE ENGINE COMPANY** Grand Haven Michigan

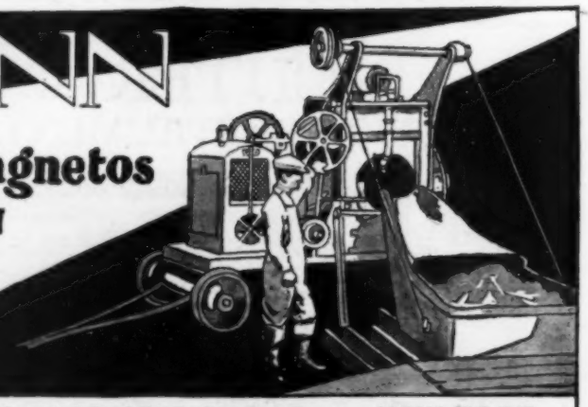
DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE DAKE

# EISEMANN



**Dependable Magnetos for CONSTRUCTION MACHINERY**

EISEMANN



EISEMANN MAGNETO CORPORATION • 60 EAST 42ND STREET • NEW YORK

# *Try This Pair This Winter*

**Sabin Co., Gloves**
**536-40 W. Federal St., Youngstown, Ohio**

Enclosed find $1.60 for sample pair your No. 259 glove size .....

Please quote us price on.....Doz. pair No. 259 glove sizes.....

Name .....

Address .....

.....

You'll say "some glove" when you slip on this pair of Sabin gloves—and you'll say it again when they're still with you and wearing well after months of use.

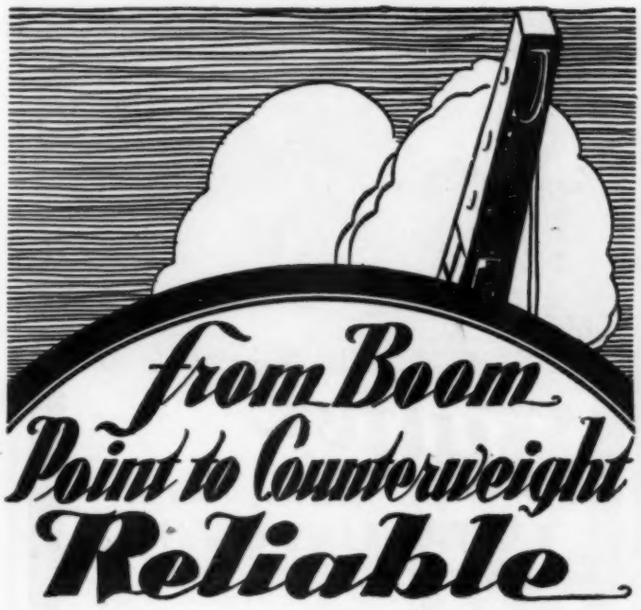
Buffed Elk hand and back, six inch Canvas Cuff, Outseams, all seams protected, hold tight back and absolutely washable—a real glove—and warm too.

**Three dollars worth of wear and comfort for $1.60. Order today.**

**Sabin Co.,—*Gloves***

536-40 W. Federal St., Youngstown, Ohio

NO. 259



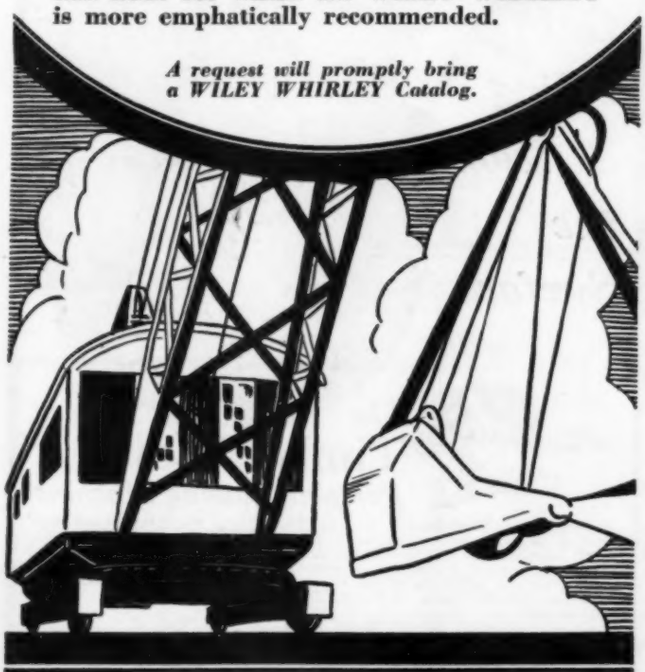
# from Boom Point to Counterweight Reliable

**It takes steady, trouble-free operation to earn profits. WILEY WHIRLEYS are built to give just that.**

**Simple design, good materials and workmanship, large reserve in frame strength and power equipment, adequate lubrication, a minimum of moving parts and these readily accessible—are the factors that make for remarkable reliability in these versatile machines.**

**Steady operation, uninterrupted by breakdowns and repair delays, is assured by the above mentioned characteristics. No quality in a machine is more valuable than reliability and none for which the WILEY WHIRLEY is more emphatically recommended.**

***A request will promptly bring a WILEY WHIRLEY Catalog.***



**The DAYTON-WHIRLEY CO.**
**DAYTON OHIO**

**No Place Too Cramped for**

## Watson-Stillman Independent Pump Jacks

They are being used extensively by Underpinning and Foundation Contractors for underpinning work, sinking piles under foundations and making tests of footings.

We make a full line of other types of jacks, and also many hydraulic devices suitable to the contractor's needs, such as concrete testing presses, benders, shears, pumps, punches, valves, tunneling shields, etc.

***Write for Catalogs***

**THE WATSON-STILLMAN CO.**
**1014 Evening Post Bldg., New York City**

# THOMAS HOISTS

***are preeminent in Construction.***

Built in all sizes to do all hoisting jobs faster and more dependably. Regularly furnished with BAND FRICTIONS and AUTOMATIC BRAKES.

*Send for Catalog*

**THOMAS ELEVATOR COMPANY CHICAGO**
**20 SOUTH NOYNE AVENUE**

The second

# 6

# Sterling

## FEATURES

contributing to

## LOWER OPERATING COSTS

»»thru More loads per man per day. Increased man-power, thru perfect balance. Lowered maintenance, last longer, interchangeable. Raised efficiency, exact sizes. Prompt field delivery. Write for Full Facts!

No. 6A—A. G. C. for dry material. Capacity 3½ cu. ft. All Sterling barrows have reinforced tray tops and corners. This is the most popular general type barrow.

No. 11—Coal and ash type. Capacity 6 cu. ft. or 350 lbs. Easiest wheeling big load barrow made. Built extra strong and rigid for tough work.

No. 6—The strongest built cart on the market. Full capacity body no axle inside. Capacity 6 cu. ft. or 1200 lbs. Perfect balance, easy wheeling. 42" wheels.

★ Handles metal or maple. Standardized design all interchangeable.

★ Changeable square bent leg shoes. Extra wear—twice the life.

★ Reinforced rodding top edge of trays. Holds shape, takes loading knocks. " " " " "

★ Riveted double-cornered trays. Reinforcement for increased load tonnage. " " " "

★ Exact size and capacity trays. Interchangeable. Raises efficiency.

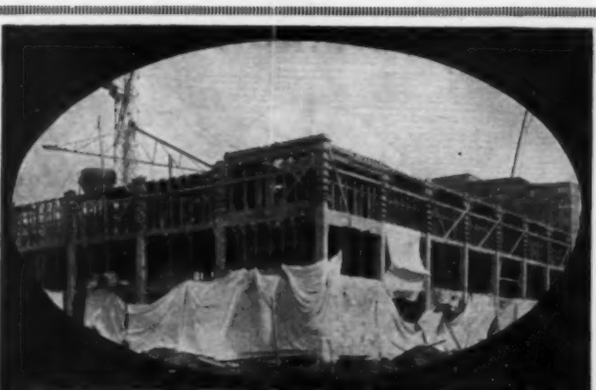
★ Complete stocks at 8 warehouses, insure prompt servicing and delivery.

STERLING WHEELBARROW COMPANY

MILWAUKEE WISCONSIN

WAREHOUSES: CHICAGO, NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, DETROIT, ST. LOUIS. DISTRIBUTORS IN ALL PRINCIPAL CITIES.





# Fultex

*Waterproofed*

## TARPAULINS & TENTS

Protection against weather-damage at low cost. "FULTEX" Khaki Waterproofed tents, tarpaulins and windbreaks—serviceable for every purpose—quality at moderate cost. Burlap—in bale or made-up covers—for protecting green concrete.

Makers of famous "SHUREDRY", "DFMP", "USAMP".

Get in touch with your nearest dealer. If he cannot supply you with "FULTEX", write us.

*Manufacturers Since 1870*

FULTON BAG & COTTON MILLS

ATLANTA · BROOKLYN · DALLAS · ST. LOUIS

MINNEAPOLIS · NEW ORLEANS · KANSAS CITY KAN.



*Cutting 12" Oak Piling 8" Below the Surface with*

Air Driven

*The* Timber Wolf

*Portable Sawing Machine*

The Greiling Engineering Co., at Frankfort, Michigan, used the Timber Wolf in cutting piling 8 in. and 20 ft. below the surface. Here operators are supported on timber framed either side of piles. The compressed air drive is supplied for cutting timber under water, to any depth in which divers can operate steadily and with great savings in labor. A.C. and D.C. electric or air driven. Write for details.

REED-PRENTICE CORP.

Worcester, Mass. *Agents in Principal Cities*

# SEARCHLIGHT SECTION

**EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or SPECIAL**

UNDISPLAYED—RATE PER WORD:
*Positions Wanted*, 5 cents a word, minimum $1.00 an insertion, payable in advance.

*Positions Vacant* and all other classifications, 10 cents a word, minimum charge $2.00.

*Proposals*, 50 cents a line an insertion.

INFORMATION:
count 10 words additional in undisplayed
*Box Numbers* in care of any of our offices ads.

*Discount* of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:
1 inch ..... $7.50
2 to 3 inches ..... 7.25 an inch
4 to 7 inches ..... 7.00 an inch
*Other spaces and contract rates on request.*
*An advertising inch* is measured vertically on one column, 3 columns—30 inches—to a page.

COPY FOR NEW ADVERTISEMENTS RECEIVED UNTIL 3 P. M. ON THE 2ND FOR THE ISSUE OUT THE 9TH OF THE MONTH. C.M.

**Used Equipment—Quick Sale—Cheap**

2—¾-yd. Marion No. 21 Cat. Steam Shovels. One Standard and One High Lift.
2—Concrete Mixers—Port., Gasoline Koering Dandie, 1078 and Republic No. 10.
1—Domestic 50 Air Compressor—Port.-Gas.
1—BCR—430 Ingersoll-Rand Jack Hammer.
1—156-H Ingersoll-Rand Trench Digger.
4—Hahn Dump Trucks, 3-5 Ton and 1-3 Ton.

**HEIGHTS CONSTRUCTION & SUPPLY CO.**
Shenandoah, Pa. Phone 493.

## YOUR NEXT ADVERTISEMENT

Should appear in the

**SEARCHLIGHT SECTION**

Let us tell you more about these columns.

*Write today to:*

**Searchlight Department**
Tenth Ave. at 36th St., N. Y.
G-12

## STEEL SHEET PILING

Bought. Sold. Rented.

## WEMLINGER INC.

Service, Technical advice, Stocks on hand everywhere.

149 BROADWAY NEW YORK

## STEEL SHEET PILING

USED NEW — SOLD-RENTED BOUGHT

CUT YOUR COST ON STEEL PILING THROUGH OUR RE-PURCHASE GUARANTEE. SHIPMENTS MADE FROM CENTRALLY LOCATED WAREHOUSE STOCKS.

FOR FOUNDATIONS, COFFERDAMS, DOCKS, WHARVES, HARBORS, SEWER WORK, CAISSONS, BULK HEADS, DOCK & QUAY WALLS, RETAINING WALLS AND SIMILAR STRUCTURES.

TELEPHONES:
Local—State 8517
Long Distance—State 8561

## S·W·LINDHEIMER INC.

38 S. Dearborn St.
CHICAGO

*"REACH THE MAN WHO WANTS ONE"*

If you have good used serviceable equipment for sale, suitable for the civil engineering and construction field, you can reach the man who wants it through the

**SEARCHLIGHT SECTION**

Searchlight advertisements are quick acting. They bring prompt returns. There is no better way to reach the men of the civil engineering and construction field at small cost.

# ALPHABETICAL INDEX TO ADVERTISEMENTS

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Construction Methods* assumes no responsibility for errors or omissions.


| | Page |
|---|---|
| American Hoist & Derrick | 71 |
| American Institute of Steel Constr., Inc. | 27 |
| American Sika Corp. | 11 |
| American Steel & Wire Co. | 22 |
| Autocar Company | 4 |
| Bay City Shovels, Inc. | 81 |
| Bethlehem Steel Co. | 18 |
| Blaw-Knox Co. | 12 |
| Browning Crane Co. | 82 |
| Bucyrus-Erie Co. | 9 |
| Butler Bin Company | 15 |
| Byers Machine Co. | 20-21 |
| Calcium Chloride Pub. Committee | 16 |
| Carnegie Steel Company | 8 |
| Carter Co., Ralph B. | 84 |
| Caterpillar Tractor Co. | 79 |
| Cleveland Rock Drill Co. | 76 |
| Cleveland Tractor Co. | 2nd Cover |
| Clyde Iron Works | 3 |
| Columbia Products Co. | 16 |
| Commercial Credit Co. | 77 |
| Contractors Mchry. Corp. | 84 |
| Dake Engine Co. | 86 |
| Davey Compressor Co. | 62-63 |
| Dayton-Whirley Co. | 87 |
| Dietz Company, R. E. | 71 |
| Dixon Crucible Co., Joseph | 82 |
| Dodge Bros. Corp. | 64 |
| Dow Chemical Co. | 16 |
| Eisemann Magneto Corp. | 86 |
| Fulton Bag & Cotton Mills | 88 |
| Galion Iron Works | 26 |
| Gohi Culverts Mfrs. Assn. | 72 |
| Goodyear Tire & Rubber | 61 |
| Greene-Tweed & Company | 68 |
| Headley Emulsified Prod. Co. | 23 |
| Hercules Motors Corp. | 10 |
| Hitchcock & Co., F. C. | 82 |
| Jaeger Machine Co. | 85 |
| Kolesch & Co. | 85 |
| Leschen & Sons Rope Co., A. | 13 |
| Lincoln Electric Co. | 83 |
| Lowell Wrench Co. | 70 |
| McGraw-Hill Book Co. | 80 |
| Mack Trucks, Inc. | 3rd Cover |
| Metalweld, Inc. | 6-7 |
| Mohawk Asphalt Heater Co. | 78 |
| Moore Trench Machine Co. | 90 |
| Morris Machine Works | 76 |
| Northern Conveyor & Mfg. Co. | 65 |
| Northwest Engineering Co. | 5 |
| Osgood Company | 25 |
| Owen Bucket Co. | 17 |
| Oxweld Acetylene Co. | 60 |
| Poor, Inc., Frederic H. | 80 |
| Ransome Concrete Mchry. Co. | 66-67 |
| Reed-Prentice Corp. | 88 |
| Republic Rubber Co. | 24 |
| Riddell Co., W. A. | 78 |
| Roebling's Sons Co., J. A. | Insert, 73-74 |
| Rogers Bros. Corp. | 85 |
| Sabin Company | 86 |
| Schramm, Inc. | 84 |
| Searchlight Section | 89 |
| Solvay Sales Corp. | 16 |
| Sterling Wheelbarrow Co. | 88 |
| Street Bros. Machine Works | 90 |
| Sullivan Machinery Co. | 70 |
| Texas Company | 4th Cover |
| Thew Shovel Co. | 69 |
| Thomas Elevator Co. | 87 |
| Toledo Pressed Steel Co. | 84 |
| United States Motors Corp. | 80 |
| Universal Atlas Cement Co. | 28 |
| Universal Crane Co. | 59 |
| Van Dorn Electric Tool Co. | 19 |
| Vulcan Iron Works—Chicago | 14 |
| Watson-Stillman Co. | 87 |
| Wehr Company | 75 |


▼ ▼ ▼

## Searchlight Section

*Classified Advertising*


| Classifications | Page |
|---|---|
| USED AND SURPLUS EQUIPMENT | |
| Heights Construction & Supply Co. | 85 |
| Lindheimer, Inc., S. W. | 89 |
| Wemlinger, Inc. | 89 |

# INVESTIGATE THIS CABLEWAY TODAY!

**Fall rope carriers set off mechanically. Roller bearing thruout. Designed for high speed with positive control. Powered by a double drum steam, electric or gasoline street hoist.**

*"The Most Essential Piece of Equipment On The Job."*

Say ANDERSON BROS. of EL PASO, TEXAS.

**STREET BROS. MACHINE WORKS - - - - CHATTANOOGA, TENN.**

HOIST—DERRICK—CABLEWAYS—SLACKLINE EXCAVATORS

# *The Moretrench Wellpoint System makes every job a dry job!* + + +

MOORE TRENCH MACHINE CO.

Rockaway, New Jersey

# A NEW *MACK* BULLDOG MODEL WITH A SIX-CYLINDER ENGINE

**MORE POWER**
**MORE *SPEED***
**MORE LOADS**
**PROPER LOAD DISTRIBUTION**

No sooner did Mack announce the addition of this six-cylinder, heavy-duty truck to the comprehensive line of four- and six-cylinder Mack Models than the COLONIAL SAND & STONE COMPANY of NEW YORK CITY placed orders for *twenty-eight*. Their experience with their Mack fleet of *ninety-eight* was enough to prove what could be expected of a Mack vehicle with such advanced features. The new high-safe-speed, heavy duty dump truck not only has the same characteristics that made the Bulldog famous for its ability to climb the steep grades with heaping loads, but combines with that the ability to maintain passenger car speeds on the open road with safety.

Where greater profits depend upon large capacity, PLUS speed, this Model AK six-cylinder truck fills a definite need in the heavy-haulage field. Send for the facts on this new Mack today.

MACK TRUCKS, INC.

25 Broadway New York, N. Y.

More than 100 Direct Mack Factory Branches operate under the titles of "MACK-INTERNATIONAL MOTOR TRUCK CORP.," "MACK MOTOR TRUCK CO." or "MACK TRUCKS OF CANADA, LTD."

TRUCKS · BUSES · FIRE APPARATUS · LOCOMOTIVES

DETROIT PUBLIC LIBRARY
DETROIT
MICH

# This world-wide army of contractors

## *couldn't be wrong*

For twenty-five years hundreds of road and street contractors have been constructing streets and highways with TEXACO Asphalt.

You will find their jobs plentifully distributed over the United States. And you will also find them in Canada, South America, Europe, Asia, Africa and Australia.

This good-sized army of contractors, American and foreign, cannot be wrong. The quality of TEXACO Asphalt products is the highest obtainable from high-grade crude petroleum by modern scientific refining methods.

Engineers in 1,450 U. S. municipalities know the excellence of TEXACO Asphalt pavements; each of these communities has TEXACO streets.

# TEXACO ASPHALT

New York
Philadelphia
Richmond
Boston
Jacksonville

**The Texas Company**
ASPHALT SALES DEPT.
135 E. 42nd Street, New York City

Chicago
Cleveland
Kansas City
Houston
Dallas
Buffalo